THE NEWSWEEKLY OF INFORMATION SYSTEMS MANAGEMENT
September 18, 1989 · Vol. XXIII · No. 38 · 148 Pages · $2/Copy · $48/Year

COMPUTERWORLD

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Risk and reward mark Merrill Lynch's decision to sign up as the first customer for IBM and MCI net management services. Page 120.

DG catches the wave, using HP windows system as front end for minicomputer office package. Page 16.

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Miniscribe scandal plays out, with internal probe report claiming fraud by former management. Page 95.

Get out the aspirin as PC virus season nears. Page 39.

Cullinet era ends; workers await CA's ax

BY STANLEY GIBSON
CW STAFF

WESTWOOD, Mass. — The final Cullinet Software, Inc. stockholders' meeting lasted all of seven minutes. When it was over, Cullinet ceased to exist.

The meeting's only order of business was to count the votes on the proposed acquisition by Computer Associates International, Inc. The result was nearly unanimous approval: With 76% of the shares voting, more than 25 million voted in favor, and only 184,000 voted against.

When the takeover was completed Tuesday, John Cullinane uttered the words, "Thank you very much for coming, and good luck," thus ending a chapter in the history of the software industry and marking the beginning of weeks of uncertainty for employees awaiting CA's decisions on work force reductions.

Several Cullinet employees who lingered after the meeting were left with feelings of relief that their ordeal, which began two years ago with a string of quarterly losses, was finally over.

"It has been like sitting outside the dentist's office for two months listening to the drill whine," said Cullinet Marketing Vice-President Jeff Papows. If it were not for CA and its Chairman Charles Wang, Papows said, "the attitude might not have been as positive as it has been. We would have been going through a downsizing, anyway."

Cullinet employees in development and support all have a

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Cullinet Software, 1968-1989

Old boss

- **1968** Founded
- **1973** IDMS introduced
- **1978** First public stock offering
- **1982** First software company listed on NYSE
- **1983** Introduced IDMS/R
- **1985** First dip in profits after 19 quarterly hikes
- **1986** Money-losing quarter in July
- **1987** Founder John Cullinane retires in September
- **1988** Cullinane comes out of retirement in March
- **1989** Computer Associates bids in June; deal closed Sept. 11

New boss

JOHN CULLINANE PHOTO: SETH RESNICK
CW CHART: FRANK C. O'CONNELL

Supercomputer users caught in eye of political typhoon

BY JAMES DALY
CW STAFF

A little federal arm-twisting can go a long way. Just ask MIT.

Deep into bargaining with Fujitsu Ltd. and NEC Corp. over a supercomputer purchase, MIT was curtly notified by the U.S. Department of Commerce that any special deal the Japanese firms may cut could be subject to antidumping proceedings. The agency also reminded the school of all the federal grant money it receives — and would probably like to continue receiving.

Faced with an offer it could not refuse, MIT shoved a Cray Research, Inc. Cray-2 into place this summer. "It became clear that important elements of the federal government would prefer to see us acquire a supercomputer based on U.S. technology," MIT Provost John Deutch said.

The situation has become so bad, as MIT learned, that the resources of some of the most powerful machines in the world may be effectively off-limits to U.S. organizations.

With computational power becoming an increasingly crucial part of competitive advantage — and the use of supercomputers trickling into areas as diverse as car assembly and weather prediction — some are beginning to wonder whether the U.S.

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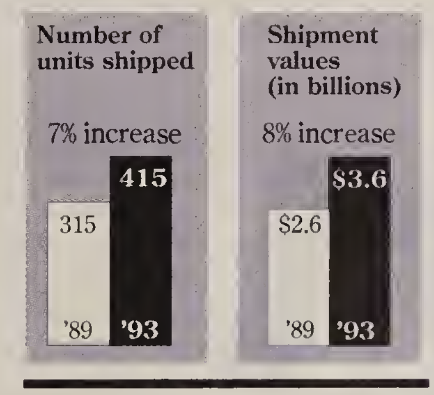
Select market

While annual shipments of supercomputers total only in the hundreds, they are worth billions of dollars



SOURCE: ELECTRONIC TRENDS PUBLICATIONS
CW CHART: JOHN YORK

Guerrilla tactics drive LAN advance

BY CHARLES VON SIMSON
CW STAFF

DALLAS — After they glanced at the gizmos in vendors' booths, the true business at hand for the managers attending Networld '89 last week was to discuss the organizational weapons they have used to fight the political guerrilla wars for control over corporate standards and proliferation of local-area networks.

Typical of the stories told was the recent installation of thousands of personal computers at Manufacturers Hanover Corp., where none of the users were provided with a hard disk.

The absence of a disk was not an oversight; it was a response from Manufacturers Hanover information systems to the realization that users were not storing their updated database information on network servers. Instead, they were using their own disks, resulting in a large lag in the integrity of corporate databases.

"We were constantly telling them to store information each night on network servers," said Stephen Morse, senior technical analyst at the New York bank. "They typically tried to do it about one minute after their system crashed. The only response we could offer was to come around with a handkerchief and

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Lightweight laptops make hefty boasts

BY JAMES DALY
and RICHARD PASTORE
CW STAFF

SUNNYVALE, Calif. — The incredible shrinking computer reached a new level of diminutiveness last week with the debut of two MS-DOS portable computers, each weighing in at about one pound and promising extended operating time powered by standard AA-size batteries.

Atari Corp. and start-up Poqet Computer Corp. both laid claim to the featherweight title by introducing handheld computers that are roughly the size of a videocassette and use less power than a twinkling Christmas-tree light.

Poqet chimed in at the high end of the new market with a $1,995 system running MS-DOS 3.3. Lotus Development Corp., Wordperfect Corp. and other heavyweight software developers have pledged to make their leading applications available on read-only memory solid-state devices the size of a credit card.

The company said deliveries of the Poqet PC will begin in the fourth quarter and conceded that it has built only 80 of the

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"We were constantly telling [users] to store information each night on network servers. They typically tried to do it about one minute after their system crashed."

STEVEN MORSE
MANUFACTURERS
HANOVER

On why his bank began installing PCs without hard disks. See story page 1.

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UPDATE

Big fish, shrinking pond. The big fish is Computer Associates, and the pond is the mainframe software business. A year ago last week, CA announced plans to swallow a key competitor. Last week, gallows humor about layoffs prevailed as employees of one-time industry star Cullinet watched the sale of their company and its identity become just a page in CA's annual report. But the haunting part of the industry change is that the acquisition plans that CA made just a year ago had nothing to do with Cullinet. At that time, CA was buying Applied Data Research, which is now just another name from another time.

Large systems vendors have had better years, but several shook off the slump and smacked some solid hits. Page 71.

A nationwide T1 network, image technology for order processing and an all-out commitment to IS service levels keep Avon calling. Page 61.

EXECUTIVE BRIEFING

■ **An essentially "free" upgrade** to an intelligent, multivendor system — the stuff IS dreams are made of — is the potential payback for becoming the first customer of network management services jointly provided by IBM and MCI Communications. The customer is Merrill Lynch, which recently negotiated a five-year contract under which MCI and IBM will develop a tailored system to centrally manage Merrill Lynch's network. The contract will cost $50 million, but that's how much the investment firm would have paid to manage its own network without an upgrade. **Page 120.**

■ **The ink was barely dry** on the final entries in Cullinet Software's books when new owner Computer Associates launched the layoff and consolidation process. As part of this consolidation, CA said that Cullinet's IDMS/R database management system will be integrated with other CA products under CA's Applications Construction Environment and will be enhanced with SQL support. **Pages 1 and 120.**

■ **Some bold strokes** were executed in the large-system market this year, but on the whole, innovation was handicapped by an industrywide slowdown in demand, according to *Computerworld*'s annual Hardware Roundup. In spite of their falling profits and layoffs, many companies managed to update their product lines. Those who took the boldest steps came from outside the IBM market: IBM and plug-compatible manufacturers maintained the status quo, but such companies as Unisys, Bull and DEC introduced new generations of high-end machines. **Page 71.** Meanwhile, the call for RISC-based technology overtook the medium-scale systems market, and even DEC couldn't fight it off. **Page 79.**

■ **One way to save** money in the IS budget is to look at the amount your company pays for data from commercial suppliers. Some Wall Street firms are trying to economize by checking out alternative sources for digitized data and by making sure that what they buy gets distributed in the most efficient manner. **Page 8.**

■ **Top IS executives** contemplating a job offer from a financially troubled company have some investigating to do, along with some soul-searching. Important issues to consider include the quality of the firm's management, products and markets as well as one's own capacity for initiative, risk-taking and long hours of tough work. **Page 102.**

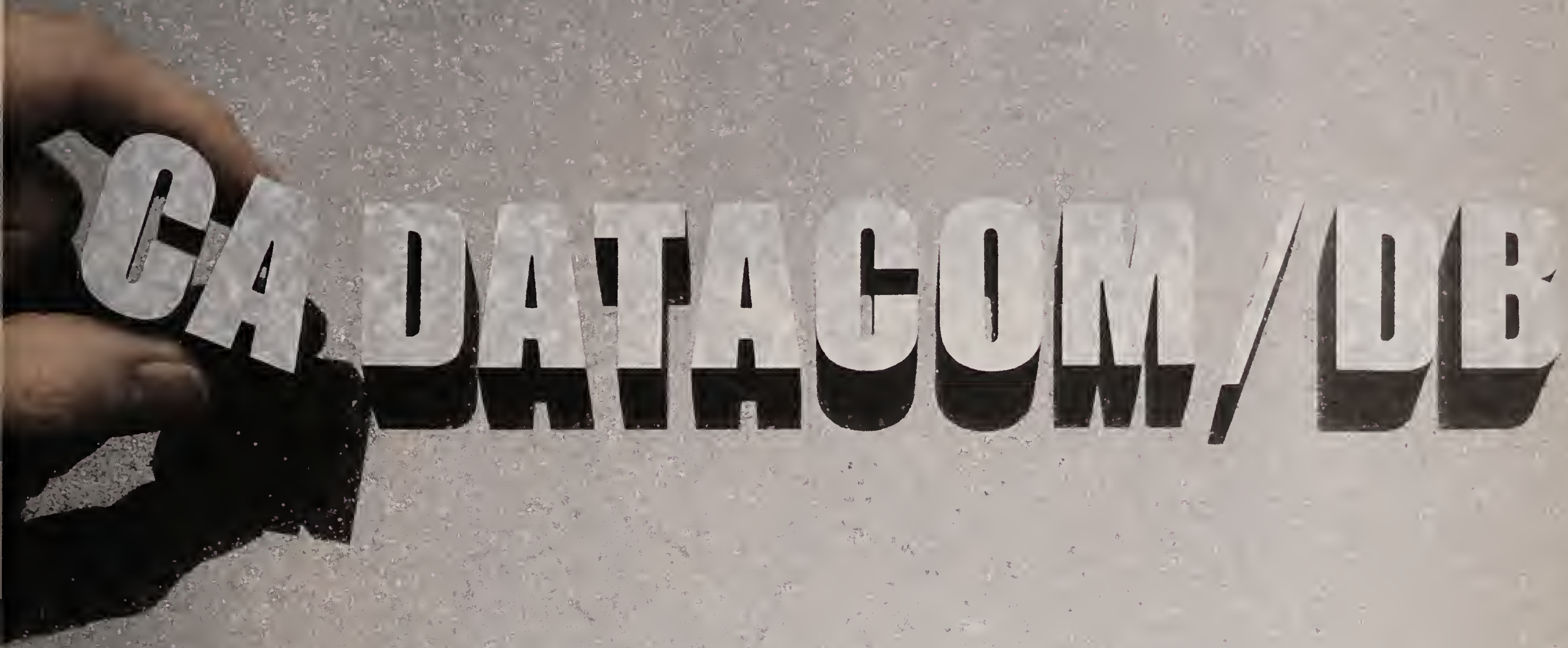
■ **Users want more** from IBM's SQL/DS DBMS. They want more performance, and they want more utilities to help them manage that DBMS. **Page 23.**

■ **A high-tech slush fund** may be the way for IS managers to experiment with leading-edge technologies without having to cost-justify the expenses for top management. It sounds sneaky, but according to one consultant, hiding such investments within the IS budget may be necessary. **Page 61.**

■ **At New York's U.S. Trust Co.**, an optical disc-based system is seen as one way to alleviate paper pandemonium. **Page 39.**

■ **IS managers can tap** their technical professionals to fill several educational roles: part-time classroom instructor, tutor and mentor or coach. Making such a program work calls for support from top management, training for the professionals who take part and recognition of their efforts. **Page 117.**

■ **Most disputes over software development** contracts revolve around who owns what rights. The issues to square away in contracting for custom-built software include which party is responsible for specific types of failure and which one may make copies and distribute them. **Page 112.**



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Wang cushions its line of minis

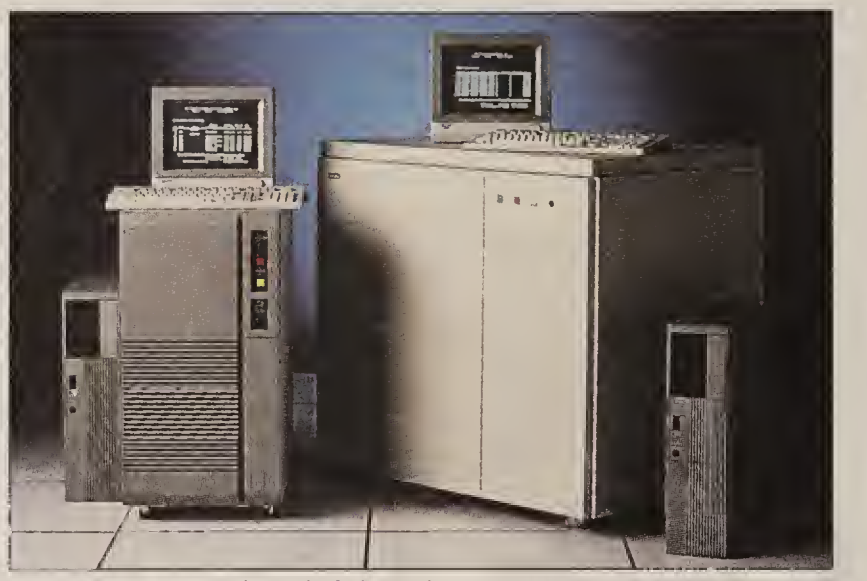
BY MARYFRAN JOHNSON
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc. fleshed out its proprietary VS line of minicomputers last week with new machines, extended capacity devices and a workstation designed to lure personal computer users into the VS family.

The VS8000 processor is being billed as a "midrange superminicomputer" that is up to three times more powerful than Wang's VS7000 machines.

For its installed base of 50,000 VS systems, the company presented three software and hardware products — called Extended Capacity Facility (ECF) — which allow VS7000 and VS8000 minicomputers to be configured with greater numbers of workstations and peripherals.

The first ECF product is an enhanced release of the VS/Virtual Machine software, allowing up to 16 multiple operating systems to run concurrently on a single system. The second product connects up to four VS/VMs to allow data file and printer sharing. A third is an I/O expansion cabinet that provides up to 15 extra slots for I/O coprocessors.


Wang beefs up *its mini line with VS8000*

With the workstation market in mind, Wang offered its VS4550 "diskless" machine, based on an Intel Corp. 80286 microprocessor and priced at $1,995. It is the first Wang workstation to allow a user to access and concurrently run MS-DOS and VS applications.

The financially shaken Wang, now in the midst of massive layoffs and creditor woes, put forth a confident face on the prospects of the VS8000 line and future product plans.

"We believe this system will obviously be attractive to our installed base and to new customers as well," said Ian Adam, Wang's director of worldwide product marketing.

Chris Christiansen , director of midrange strategies at Meta Group, Inc. in Westport, Conn., saw it a bit differently: "This is a good solution for Wang's installed base, but they're not going to attract substantial numbers of new customers."

Christiansen particularly criticized the VS8000's lack of a new operating system, saying that the ECF products were "cobbled together" to make up for the lack of greater task support that a more advanced operating system could provide.

Company officials responded that a new operating system would be out "in a few months" to replace the VS Version 7.30 operating system now used for both VS7000 and VS8000 machines.

The VS8200 and VS8400 series are intended for customers with large volume data processing and office automation needs. The VS8200 can support up to 192 workstations, and the VS8400 takes up to 900 workstations and peripherals.

A VS8200 with 4M bytes of memory and an annual VS license costs $80,000, while a VS8430 with 8M bytes of memory and an annual VS license costs $204,000.

For Columbia Sportswear Co. in Portland, Ore., the VS8200 has been a blessing during its few weeks in residence at the sportswear manufacturer and wholesaler.

"We're using it in basically all aspects of our operation," said Shari Jacobson, the company's chief financial officer.

Polished OS/2 upgrade a memory muncher

BY PATRICIA KEEFE
CW STAFF

Faster performance, bigger files and greater support for memory-intensive MS-DOS applications are the drawing cards held by Release 1.2 of OS/2 Standard Edition. On the downside, these additional capabilities further pad an already bloated overhead for Microsoft Corp.'s flagship operating system.

In recent briefings, Microsoft has been highlighting an improved DOS-compatibility box, a high-performance file system (HPFS), a modified graphical user interface and a system editor for IBM and Microsoft's OS/2 Presentation Manager.

"It's a lot better than under 1.1," said an information systems manager responsible for workstation platforms at a large West Coast-based insurance carrier, which has anointed OS/2 as its desktop standard.

However, the IS manager said he would have liked even better performance improvement and "expected Release 1.2 to take up less memory than 1.1."

Although he said he can live with the shortcomings of 1.2 — which is due for general release this month from IBM — the IS manager made it clear that if the next release of OS/2 takes up even more memory, he will start to become concerned, possibly enough to slow down further migration to OS/2.

"It's one thing to have these features and functions available to me, but I have to look at what it's going to cost me," he said, pointing out that a 2M-byte chip set currently costs $1,395.

The IS manager said he was enthusiastic that Microsoft increased memory available to DOS applications running in OS/2's DOS-compatibility box. He estimated that the addition of 40K bytes of random-access memory will let him run another 10% to 20% of his current stable of DOS applications. He cited Borland International's Paradox and Lotus Development Corp.'s 1-2-3 as examples of applications that "just didn't run" before.

Also attractive is the ability to launch a DOS application from a Presentation Manager shell. "Previously you had to go into the compatibility box and select what you wanted to run. Now, I can deliver an OS/2 desktop to a user where they can launch a program from an icon without knowing whether it's DOS or OS/2," the IS manager said. "It makes it easier for them to use."

HPFS offers several purported improvements over the File Allocation Table, or FAT file system of MS-DOS, basically by re-engineering the way data is laid out on the directory and in files on the hard drive. It supports installable file systems, making it possible to access multiple incompatible volume structures — FAT, HPFS, compact disk/read-only memory and possibly Unix — on the same OS/2 system, according to the September issue of the *Microsoft Systems Journal.*

Existing applications will have to be modified to take advantage of HPFS, so it is not clear how soon users can expect to reap the advantages of it.

Unix still in the scene?

While OS/2 remains positioned as the clear successor to MS-DOS on the desktop, Microsoft made it equally clear last week that it is not cutting Unix out of the picture.

In briefings last week on Release 1.2 of OS/2 Standard Edition, Microsoft predicted an increase in Unix development activity between 1988 and 1990. Microsoft expects similar efforts in the OS/2 market to more than reverse the significant DOS mindshare among developers in 1988 by next year.

In briefings and presentations, Peter Neupert, senior general manager for OS/2, outlined several avenues for Unix support:

- It will continue to supply Unix through The Santa Cruz Operation.
- It will invest in technology to port Presentation Manager to Unix. The port will be called PM/X.
- LAN Manager/X (LM/X), which is scheduled to be shipped possibly this month by developer Hewlett-Packard Co., will provide Microsoft's answer to Novell, Inc.'s Portable Netware. OEMs will be able to port LM/X to their proprietary platforms.

Some confusion may be created by AT&T, which is developing its own Unix port of LAN Manager, slated for delivery in the first quarter, according to a source.

PATRICIA KEEFE

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HP image yet to play in Peoria

BY J. A. SAVAGE
CW STAFF

SAN FRANCISCO — Nearly 4,000 Hewlett-Packard Co. users flocked to the 15th annual Interex conference last week for a firsthand view of the glitzy new image HP has been cultivating in the last year.

With giant video screens and rock-and-roll music underscoring HP's recent aggressive nature, some users were wondering when the transformation would become evident in their day-to-day contacts with HP.

"I can't find a single person at HP who is interested [in] selling on the same level as IBM," commented Robert Meissner, director of information systems at Welding Engineers, Inc. in Blue Bell, Pa. He said that IBM could still sweep his management off their feet with a sales presentation.

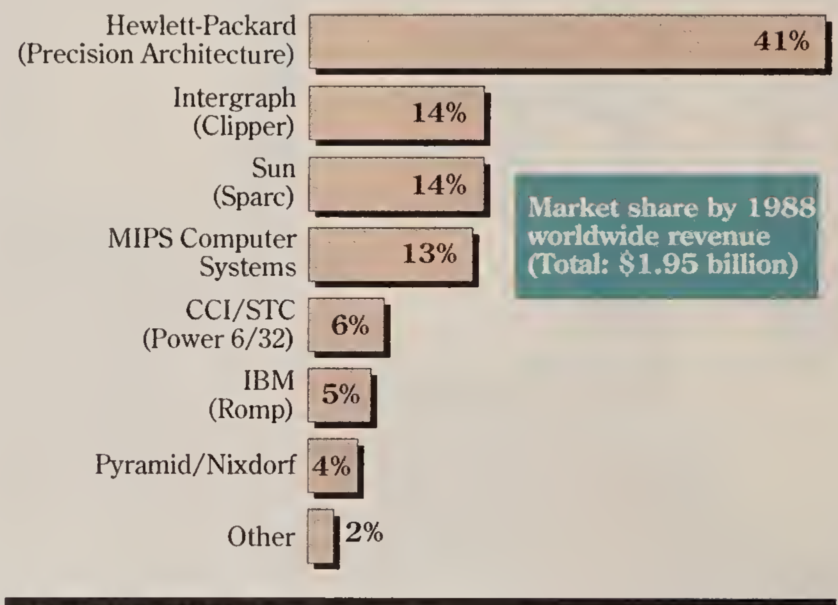
In addition to image identification, users said that it is still taking time to resolve a previous image shakeup when HP dissolved the lines between its commercial and business sectors and recognized that reduced instruction set computing (RISC) and Unix were being used in both.

"They're still visited by either a technical or commercial sales person," said Bob Grenoble, executive director of Interex in Sunnyvale, Calif. However, he added that the sales force, which used to be composed of engineers, has exhibited a broader knowlege of business systems.

Also lagging is HP's development of a wider bandwidth for its computers. Improving "the bandwidth between the storage hierarchy and the processing units" has fallen behind, conceded Joel Birnbaum, vice-president and general manager of the company's Information Architecture Group. Birnbaum said the company's second generation of RISC machines would address this roadblock.

RISC pays off

With its early commitment to RISC, HP has been the greatest beneficiary of system sales using the newer technology



SOURCE: RISC MANAGEMENT NEWSLETTER

CW CHART: JOHN YORK

Still, Chief Executive Officer John Young told users that the RISC hardware would improve in price/performance by 50% per year instead of the 30% per year that was evidenced in traditional architecture.

1000 fears

Users, while curious about the latest technology, appeared more interested in HP's older machines. For instance, there were fears that the 23-year-old Model 1000, a family of technical manufacturing computers with the proprietary RTE operating system, would be a dead end despite some soft assurances from Willem Roelandts, vice-president and general manager of the company's Computer Systems Group, that new products are under discussion.

"I don't think users believe they will have new 1000s," Grenoble said.

Another area in which users were highly critical of HP was its maintenance support. One user complained the company gets neither his mailing address nor the terms of his contract correct. This comes one year after a much-ballyhooed multivendor support division was established to increase support services.

More jazz

While HP users thronged in San Francisco, users from the company's new acquisition, Apollo, had their annual meeting halfway across the country in New Orleans, where a cut-rate workstation and two midlevel workstations were announced.

Garnering the most attention is the Series 2500 for $3,990, which is said to offer full workstation functions in two- and three-dimensional applications. It is based on a Motorola, Inc. 68030 processor.

The low cost is attributable to Apollo's single-board injection, said Dick Watts, HP's director of marketing for the computer products sector.

It will likely rival the cost of Korean-made HP clones expected from Samsung Electronics Ltd. during the next two years. Last month, Samsung said it will manufacture low-end reduced instruction set computing (RISC) workstations for HP. They will feature the higher performance of the RISC architecture and are expected to be in the $5,000 price range.

"I'm sure there's a certain amount of gamesmanship involved, like, 'OK, Sun match this,' " said Andrew Allison, editor of the "RISC Management Newsletter" in Los Altos, Calif. Users may think twice before spending $10,000 on an IBM Personal System/2 or similar computer if they can get by on Motorola 68030 applications, he added.

J. A. SAVAGE

Mini upgrade, other rollouts key Interex HP conference

HP chose its annual user group meeting, Interex, to unveil more than a dozen products, including its biggest minicomputer with the claimed performance of a low-end mainframe.

At 15 million instructions per second (MIPS), the HP 3000 Model 960 claims a maximum user base of 600. This is up from the Model 955 earlier this year which claimed more than 400 users and 11 MIPS. The model features mirror-disk operation, the first product in the line to do so.

The Model 960 is a board upgrade from the 955. Additionally, the company reduced the price of the 955 from $390,000 to $385,000. The Model 960 is $485,000. Optimization for existing products has led the company to open a research and development lab for performance tools. Its second product, Laser RX/UX, was unveiled last week.

The diagnostic and systems management software runs on HP's Unix systems. HP has submitted its specifications to the Open Software Foundation for blessing as a Unix standard tool, said Susan Cook, product marketing manager. The company's first product was customized for HP's proprietary operating system, MPE.

Aiming at the daisywheel and dot matrix printer market, HP now offers a Laserjet printer for $1,495. The Model IIP claims a 4-page/min. output at 300 dots per inch.

The printer, which analysts expect to be the preferred desktop design in the near future, has 14 typefaces available. It also has cartridges for accessing printer languages such as two Epson America, Inc. Proprinter languages and an IBM Proprinter language.

For the HP 3000 Series 900 computers, several functions will be added with the next proprietary operating system release, Version 2.0, expected early next year. These functions include the following:

- A local-area network gateway to integrate Novell, Inc.'s networks.
- IBM 3290 terminal access through Systems Network Architecture Distributed Host Command Facility.
- An LU6.2 application programming interface to allow communication between IBM mainframes and HP 3000s on a program-by-program basis.

J. A. SAVAGE

Former ITT exec gets nod from CIS

BY NELL MARGOLIS
CW STAFF

SYRACUSE, N.Y.— Bidding to buy sidelined computer-leasing player Continental Information Systems Corp. (CIS) out of bankruptcy entered the homestretch last week when the firm's board of directors accepted a $420 million offer from former ITT Chairman Harold S. Geneen.

CIS' creditors have yet to bless the deal, which must be approved by the bankruptcy court, and questions raised by rival bidder Finalco Corp. indicate that the race is still very much on.

The bid by CIS Acquisition Corp. (CAC), a N.Y.-based company created and headed by industry legend Geneen, comprises $75 million in cash and $345 million in "unsecured promissory notes paid out of CAC cash flow," said CIS spokesman Paul Brooks. Since CAC's sole asset, at least initially, will be CIS, the company will have to earn the bulk of its own buyout price, Brooks said.

"Basically, it's a swap of securities," said Thomas J. Donovan, vice-president of investment banking at Framingham, Mass.-based IDG Financial Services, Inc. "CIS would be trading some $400 million in creditors' claims for $345 million in other claims."

Moreover, said Donovan, Geneen's credibility is clouded by CAC's failure to raise funds to support its otherwise-winning $18 million bid for CIS' Canadian subsidiary earlier in the CIS Chapter 11 proceeding. "I don't think this deal is going to go through," Donovan said.

Qualms about management as well as money could color the prospects for CAC, said Harold Van Arnem, chairman of Finalco, a Boca Raton, Fla.-based computer lessor.

"We've been told by the creditors' committee that we're the preferred bidder, mainly because of our extensive experience in the computer leasing business," Van Arnem said. "We not only have financing but have put together a 125-person sales force that is waiting and ready to go. Geneen brings nothing to the party but himself."

Finalco's partner in its attempt to buy CIS is Concord, a subsidiary of the Bank of Hong Kong. Several industry sources last week confirmed the Finalco bid at $75 million in cash — an amount identical to the Geneen cash bid — and $175 to $200 million in bonds.

Under the terms of the CAC proposal, the company will remain "substantially intact, in Syracuse and at other locations," Brooks said. The proposal contemplates "no substantial reductions in work force."

No definitive representations with regard to current CIS management have been made, Brooks said. If "substantially intact" extends to CIS management, Van Arnem said, then "what's on the table right now is the same group that has put the company in the mess it's in right now." Neither Geneen nor CIS Chairman and Chief Executive Officer Harry Goetzmann Jr. was available for comment.

The final word, all agree, will come from the creditors and the federal bankruptcy judge. Under applicable law, Brooks said, "the court has up to 60 days — sometimes longer — to solicit opinions and hear discussion." Throughout that period, the law provides, the offer in question is subject to higher and better offers.

LAN advance

CONTINUED FROM PAGE 1

cry with them." Users now have no choice, Morse explained, and a network manager ensures that data is carefully stowed daily on a server.

The most significant tactical shift was based on the near-consensus that hard-number financial justification was not the best way to justify networks to senior management.

"Management does not believe that you can cost-justify a LAN," said Bob Moscowitz, network technology support specialist at Chrysler Corp. "If you do, you are viewed suspiciously; people assume your numbers are cooked."

The best way

Instead, several managers agreed the best strategy is to compile a comprehensive list of users who have embraced the technology and use that political momentum in any pitch to senior people.

However, "getting user coalitions together can be dangerous," said Eldon Moreland, network analyst at the Gas Clearing House Co., a Houston natural gas broker.

"To keep them behind you, everyone has to get their piece of the action; that can mean you wind up with a political rather than a functional LAN," Moreland said.

Moreland points to the company's first server, which was purchased because of the support of three constituencies. When the machine arrived, the users partitioned the hard disk three ways and denied access to each other. "Initially, it defeated the whole purpose," Moreland said.

The growing complexity of networks is also pushing users into much tighter relationships with network vendors, such as Novell, Inc. and 3Com Corp.

Deming-inspired

"We are a food company, and we do not want to get into the computer business," said Chuck Clabots, group leader of the network technology group at Pillsbury Co. "That has led to a Deming-inspired relationship with Novell as our principal supplier."

Clabots was referring to W. Edwards Deming, whose pioneer work on industrial quality advocated close relationships with a few suppliers that could work in a partnership with a company.

First Bank System, a midwestern bank holding company based in Minneapolis, has a similar relationship with Banyan Systems, Inc.

"The ability to keep a single operating system and work as closely as we do, on a weekly basis, with Banyan support has greatly simplified our development process," said David Devries, senior LAN analyst.

Although close vendor relations have solved some technical problems for Devries, the organizational conflict surrounding ownership and billing for LAN use still rages at First Bank System, as it does at most companies.

"We are in the process of proposing that the information center take control over LANs," Devries said. "But because of advanced protocols like LU6.2, it is impossible to draw a line where communications end and applications begin. We are still fighting over location of workstation and servers; I am not certain how it will come out."

Intel unveils multitasking chip

BY JAMES DALY
CW STAFF

SAN FRANCISCO — Intel Corp. continued a busy year of microprocessor introductions last week with the rollout of a chip that can juggle as many as three tasks at once.

While multitasking is common in many areas of computing, the 32-bit I960 uses a technique called superscalar parallel processing to become the first commercially available chip to fetch, decode and begin executing several instructions simultaneously.

Conventional chips typically process only one instruction per clock cycle.

In the past, chip makers have tried to increase performance by cramming more transistors onto a chip; Intel unveiled two models recently — the I860 and 80486 — that each have more than one million transistors.

"But we knew that simply increasing clock speeds to execute serial events faster would translate into cost-prohibitive memories and peripheral components," said Ken Fine, general manager at the Santa Clara, Calif.-based company's Chandler Microcomputer/ASIC Division.

With the added speed, the I960 can process up to 66 million instructions per second (MIPS) with a burst capability of 100 MIPS, Fine said. Although it can execute three instructions per clock cycle, it averages two, he added.

The chip, which will be priced from $219 to $325, will not be used in personal computers — the main market for Intel processors. Instead, the I960 will be used as an embedded microprocessor. Unlike the kind of user-programmable chips found in PCs, embedded chips are preprogrammed to serve as the brains of devices ranging from coffee makers to the autopilot on an airplane.

"Embedded chips have a much lower profile, but they far and away account for a majority of chip sales," said Michael Slater, editor of the industry newsletter "Microprocessor Report."

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NEWS SHORTS

Touche Ross, Unisys pair up

Accounting and consulting firm Touche Ross & Co. and Unisys Corp. announced an alliance last week under which they will provide large-scale systems integration. One of the two firms will be identified as the prime contractor for each major integration project, based on the skills needed.

……

Unisys offers new disks

Unisys also moved last week to boost on-line storage capacity for all of its mainframe lines by releasing new disk subsystems. The 1G-byte M9720 subsystem will be offered for the Unisys 1100/90 and 2200 series of mainframes, and the M9710 is designed for the A and V series of mainframes.

……

Teflian named CIO at Covia

Covia Corp. created a chief information officer position last week and awarded it to Mark Teflian, formerly vice-president of technical planning and systems engineering at the jointly held airline information systems subsidiary. The appointment is primarily a title change, given that Teflian will essentially retain his former job's responsibilities.

……

ACM warns of decline in R&D

The president of the Association for Computing Machinery last week wrote a letter to President Bush commending him on his call for international participation in the space program. However, Bryan Kocher also warned Bush that a decline in software engineering and computer science research and development may imperil the U.S.' ability to carry out the ambitious goals of the space program.

……

Price cut for NEC Ultralite

The little laptop with the big price tag, NEC Home Electronics, Inc.'s Ultralite, dropped in price last week as NEC cut the price of the 2M-byte model from $3,699 to $2,999 and the 1M-byte model from $2,999 to $2,499. NEC, which plans to make a laptop announcement today, said sales had exceeded expectations and that economies of scale made the reductions possible.

……

Novell hits lower mark

As expected, Novell, Inc. last week announced third-quarter revenue growth slightly below last year's figures. While total revenue was up 13% over last year, earnings slid about 2.5%. The company cited nonrecurring charges associated with the acquisition of Excelan, Inc. as a significant factor.

……

Vendors back RPC offering

Sun Microsystems, Inc., Netwise, Inc. and Novell, Inc. rounded up 18 vendors and one user last week in an effort to get the development community standardized on a remote procedure call (RPC) based on the three firms' technology. RPCs shield developers from lower level communications protocols and enable them to develop distributed networked applications that run across heterogeneous platforms without modification. Digital Equipment Corp. and Hewlett-Packard Co.'s Apollo Division are pushing a competing RPC.

……

IBM buys stake in Index

Continuing its acquisition spree in the computer-aided software engineering (CASE) field, IBM last week agreed to buy a minority equity interest in CASE vendor Index Technology Corp. IBM will pay $2.5 million for a 5% interest in Index.

……

Judge OKs Leading Edge proposal

A bankruptcy court last week approved a reorganization plan for Leading Edge Products, Inc., which had been operating under Chapter 11 protection since February. The plan, funded by Daewoo Telecom, Inc., provides for payment of 400 creditors, primarily with Leading Edge products.

Securities firms eye data costs

BY DAVID A. LUDLUM
CW STAFF

Information systems managers under the gun to cut costs are training their sights on a new target — the digitized data their companies buy from commercial suppliers, often for tens of millions of dollars a year.

Securities and investment firms — major buyers of data that are struggling with shrinking profits — are among the leaders of the campaign. At least two major Wall Street firms are contemplating a two-fronted assault — scaling back outlays to vendors and streamlining distribution of data once it is bought.

At Merrill Lynch & Co., "1990 will be the year of market data," said Bruce Turkstra, the company's senior vice-president of global information services. That emphasis follows this year's focus on telecommunications and last year's push for data center consolidation, Turkstra told vendors at the annual conference of the Information Industry Association in New York last week.

In the past, Merrill Lynch business units that used data acquired it on their own; now the company wants to standardize purchasing. Merrill Lynch, which spends $180 million a year buying data from 66 suppliers, wants to consolidate purchases among fewer vendors and integrate ordering, installation and billing, Turkstra said.

Adam, *Goldman Sachs' top systems executive*

Such efforts are driven in part by the hefty profit margins reaped by data vendors, said Rick Adam, a partner and the top systems executive at Goldman, Sachs & Co. Businesses enjoy declining costs for purchases of many products and services such as telecommunications, but prices for some financial market data are going up, Adam said.

Goldman Sachs spends tens of millions of dollars a year on electronic information and is targeting that outlay as its priority in reducing costs, Adam added: "As prices stay high, then you look at trying to find alternate sources; you look at make vs. buy decisions to see if you could do it yourself at a lower cost."

Adam and Turkstra also stressed the need for more efficient distribution of data. Merrill Lynch is contemplating a technology platform for distributing all market data in the firm, Turkstra said.

Adam suggested using electronic data interchange among the 200 companies with which it shares information, mostly through point-to-point connections. More methodical communications would promote standards, lower costs and improve capacity utilization, he said.

Laptops

FROM PAGE 1

devices so far.

Atari wrapped itself in the low-price mantle of $399 for a 128K-byte random-access memory base model expandable to 640K bytes; immediate shipments have begun, the firm said.

Although there are few such machines available now, "You're going to see a lot more," predicted Kimball Brown, an analyst at Prudential-Bache Securities, Inc. in New York. "There is a really good market for these machines." Users are not satisfied with just data collectors or units capable only of manipulating files downloaded from full-function machines, Brown said.

The Poqet uses a mere 50 milliwatts of power. The secret is that the machine has no moving parts. Rotating magnetic drives have been replaced by the solid-state integrated circuit memory cards. Although the power from two batteries shuts off between keystrokes — providing an operational life of up to 100 hours — the portable offers an access time of 100 nsec. At the heart of the machine is a 7-MHz Intel Corp. 80C88 chip.

"It sets a new standard for IBM-compatible computing. There's nothing quite like it on the market," said Bill Lempesis, an analyst at San Jose, Calif.-based Dataquest, Inc. Lempesis said the only thing that may inhibit early sales of the Poqet PC is its relatively high price. Entry-level laptops can be had for as little as $600.

Both companies offer standard QWERTY keyboards; Poqet's system provides 77 keys, and Atari's offers 63.

Atari's Portfolio, which also powers off between keystrokes, is powered by three AA-size batteries that have a continuous-use life of 48 hours, the company said.

The Atari machine runs an operating system "adapted" from DOS 2.11 and uses a 4.9-MHz 80C88 microprocessor. Its screen only provides a 40-column, eight-line LCD, but its window function enables users to access any portion of a virtual 80-column, 25-line display. Poqet, on the other hand, trotted out an 80-character by 25-line display with resolution of 640 by 200 pixels, compared with Atari's 240- by 64-pixel resolution.

Both companies said their systems can be connected to desktop PCs for file transfer and bundled in various applications in read-only memory. Poqet also introduced a portable 1.44M-byte floppy disk drive powered by four AA batteries that the company said will operate for 25 hours at a 20% utilization rate. The Poqet PC includes 512K bytes of RAM, and the company said it plans to pump up current 512K-byte RAM storage cards with 2M-byte cards next year; Atari said it will provide optional storage on cards offering 32K, 64K or 128K bytes of memory.

Although Poqet has not built many systems to date, it has big plans. Marketing director Gerry Purdy said the 19-month-old company hopes to sell 300,000 machines next year.

Poqet's odds of success are increased by the financial backing of Fujitsu Ltd., which owns 38% of the company. Additionally, Fujitsu is working on a Japanese-language version of the product and can ensure a steady component supply in the event of a RAM chip shortage, Poqet President Stan Prodromou said.

Poqet's secret *is no moving parts*

Early evaluators seemed ready for the Poqet PC. One potential customer is Amdahl Corp. — in which Poqet backer Fujitsu has a 49% share — which is considering arming its national sales force with the portable. "We have laptops now, but they're often so cumbersome that they are frequently left behind," said Linda Fadden, manager of marketing systems. "We're looking for true portability, and Poqet may have something here."

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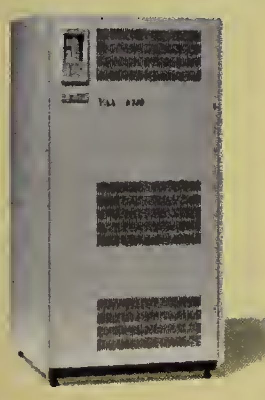 VAX/ULTRIX	ORACLE	~~Rdb~~
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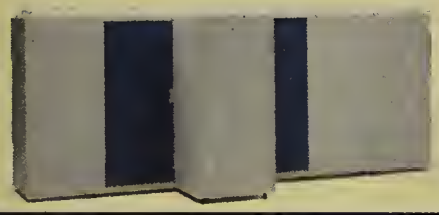 IBM Mainframe	ORACLE	~~Rdb~~

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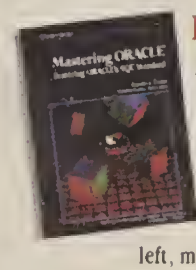

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Xyvision makes the 'open' shift

BY MARYFRAN JOHNSON
CW STAFF

WAKEFIELD, Mass. — With the introduction of multiplatform publishing software this week, Xyvision, Inc. is taking a long-awaited leap into the open systems mainstream.

At the Seybold Computer Publishing Conference in San Francisco Sept. 21, the company will announce its Parlance system of professional publishing software, hardware and services — running for the first time on Digital Equipment Corp. workstations and servers as well as on the company's own proprietary hardware.

"The significant change for us is in offering this multiplatform architecture support," said Kevin Cavanaugh, Xyvision's director of product marketing. "Any machine that supports NFS will also support the Xyvision database."

Corporate customers have been waiting for the company to integrate its publishing software with its other business applications, according to Mark Walter, associate editor of the "Seybold Report on Publishing Systems."

"This brings Xyvision into the mainstream of where other workstation publishing vendors have been for a couple of years," Walter added. "They had to give in to market pressure. They're the last holdout."

The new release of Xyvision software, Integrated Publishing System (IPS) 3.0, will run on Decstation 2100 and 3100 workstations and on Decsystem 5400 and 5800 servers, as well as on Xyvision's own brand of workstations and servers.

IPS 3.0 is available immediately, but it will be next spring before the entire Parlance system is ready to ship, a company spokesman said.

Arcnet gains market team

BY PATRICIA KEEFE
CW STAFF

DALLAS — Three Arcnet vendors have formed an alliance to market Datapoint Corp.'s 20M bit/sec. Arcnetplus, scheduled to ship early next year.

Joining Datapoint are Standard Microsystems Corp. and NCR Microelectronic Products Division. The three firms said they will provide a range of Arcnetplus products, which will be compatible with existing 2.5M bit/sec. Arcnet connections.

At 20M bit/sec., Arcnet eclipses 10M bit/sec. Ethernet as well as 4M and 16M bit/sec. Token-Ring. But the new Arcnet is not likely to shoot past its more popular rivals despite its speed advantage. The 12-year-old Arcnet technology never became as important a standard as did Ethernet and Token-Ring, partly because Datapoint passed on its chance to open up the then-proprietary Arcnet years ago. A wide-open Ethernet stepped into the breach, and the rest is networking history.

Arcnet has a strong following among users of small Novell, Inc. Netware networks. Gartner Group, Inc. in Stamford, Conn., has predicted that the number of Arcnet nodes will grow from six million to 25 million by 1993.

There are two agendas for Arcnetplus, according to Frank Dzubeck, a network consultant and president of Communications Network Architects, Inc.

The first is to assist a struggling Datapoint. The firm's efforts to grow the installed base are hampered by the fact that many applications crawl at turtle-like speeds on the current Arcnet bandwidth of 2.5M bit/sec. A faster Arcnet will correct that problem, Dzubeck said.

The second challenge is to remain a price leader. For the 20M-bit Arcnet to fly, it will have to be priced under the market leaders, warned International Data Corp.'s Lee Doyle.

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IBM keeps Unix effort veiled

BY AMY CORTESE
CW STAFF

Details on IBM's next generation of Unix systems have been shrouded in secrecy and nondisclosure agreements, but sources confirmed last week that the announcement has been pushed back to early next year.

The delay has prompted widespread speculation among software developers that IBM is experiencing problems with its next release of AIX, its Unix system. Sources say that IBM will include multiprocessing capabilities in its Release 3 version of Unix, which could be a factor in the postponement.

According to one informed vendor who asked to remain anonymous, IBM will announce and deliver the new RT workstation models in early January rather than go ahead with a planned October announcement. The problem, he said, is not with the hardware, although he declined to be more specific.

"We're anxious to see the RT developed further and IBM live up to its promises," said Bob Martin, senior vice-president of corporate information systems at Wal-Mart Stores, Inc.'s headquarters in Bentonville, Ark., which has used RTs for three years. "This is not the first slippage."

IBM had not publicly set an introduction date, but developers had expected an October announcement; earlier this month, IBM conceded that a 1990 introduction was a possibility [CW, Sept. 4]. IBM had gone as far as booking hotel space for an Oct. 17 announcement, said Marc Shulman, an analyst at UBS Securities in New York, "but conversations with independent software vendors and customers convinced them it would be better to announce with lots of software applications."

However, software developers seem to be in the dark on IBM's AIX plans.

Developers contacted last week had not yet received from IBM any systems on which to start development, nor did any have an idea when they could expect to do so.

Dick Albright, director of marketing for integration at San Jose, Calif.-based Valid Logic, Inc., said his firm had given IBM the same message it gave other partners: To have software ready to demonstrate at an announcement, they would need two to three months' lead time with the RT hardware.

Stan Timms, director of Unix marketing at Oracle Corp., said IBM has been "rather fuzzy" on an introduction date. It appears that IBM is "backing off from initial expectations," he said, speculating that performance has not met IBM expectations.

Muscle-building

The new family of RT workstations and multiuser systems make up IBM's next generation, which some say is its first serious Unix offering. The earlier RT models, plagued with bugs and slow performance, were only able to gain hold of 2% to 3% of the Unix market.

With the next-generation RTs, analysts said IBM hopes to bury its plagued Unix reputation with high-performance models and a robust graphics and software environment. Some anticipate models nearing 50 million instructions per second (MIPS).

Shulman said the new family will include high-end models in the 40- to 50-MIPS range, with 8G bytes of disk storage and support for up to 512 users. He did not know whether a multiprocessing model would be included but said that IBM is capable of delivering that level of performance with a uniprocessor.

Sources confirmed that a multiprocessing capability will be featured in AIX Release 3, possibly making IBM the first major vendor to market a symmetric multiprocessing version of Unix. Digital Equipment Corp. has the next version of its Ultrix operating system with SMP in field tests, the company said.

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Impact helps soften deadline blow

BY ALAN J. RYAN
CW STAFF

BOSTON — The jig may be up for executives who are not proficient at meeting deadlines.

Pilot Executive Software last week announced Impact, a software product designed to help management teams address high-priority goals and issues. By using the application, executives can reportedly track progress on a project and will be alerted if deadlines are missed.

High-priority goals may include short-term issues such as a strike, high turnover rate at one sales office, an explosion at a warehouse or failure to meet safety standards in a manufacturing environment, said Tom McAuliffe, Pilot president and chief executive officer. Normal tracking of financial and sales data will be done by the Pilot Command Center executive information system that Impact will work with, McAuliffe said.

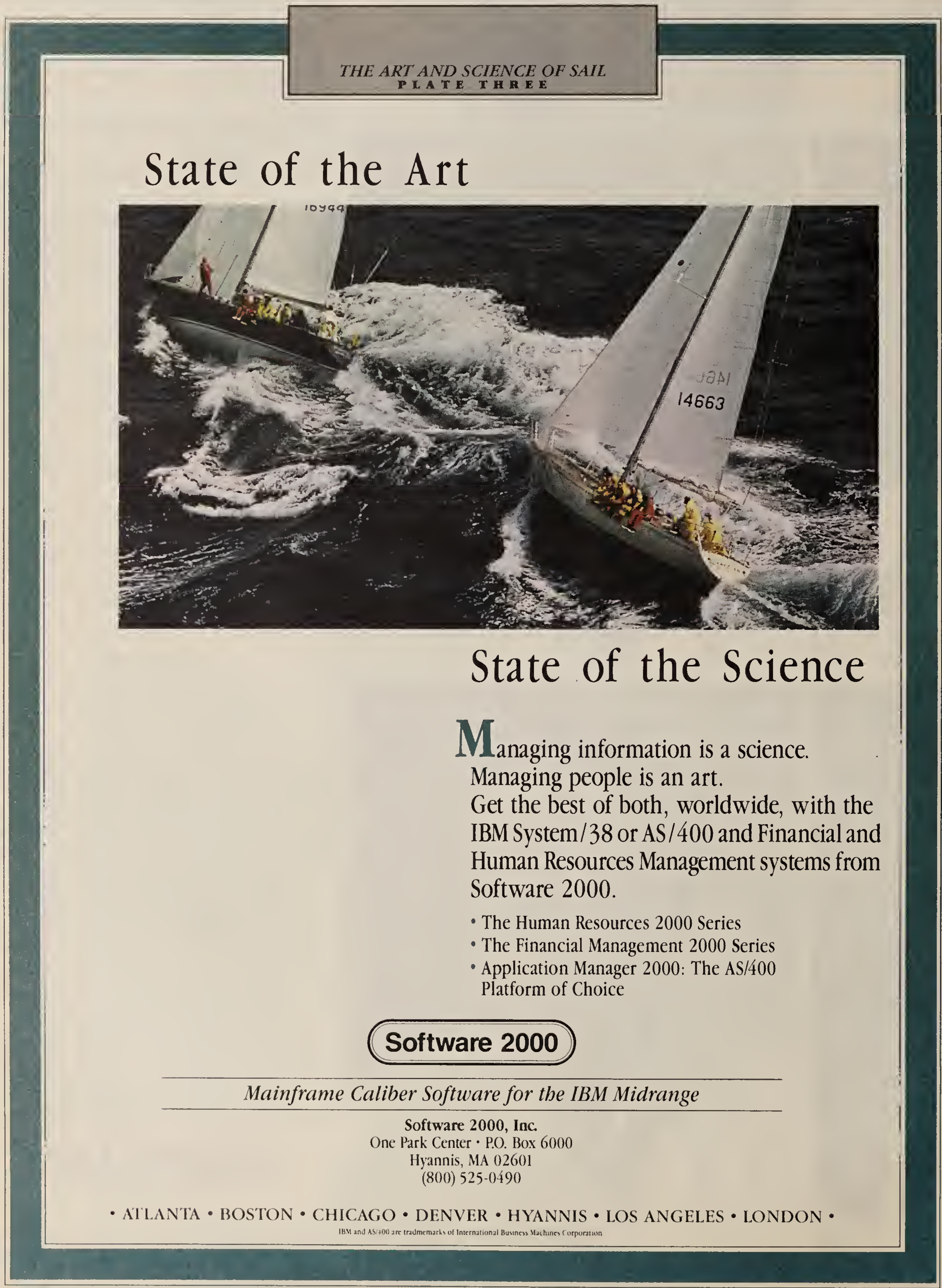
The short-term issues can be plugged into the Impact system without help from the information systems department or programmers, he added.

"The objective is to be able to use the system to manage and control short-term issues that come and go very quickly," McAuliffe said. If IS had to be called in, he said, it could take weeks to build such a system. By then, the critical issue might already be resolved.

The software allows managers to assign reporting tasks on critical issues to specific individuals. Managers can specify exactly the information they want as well as the frequency of desired updates. The assignments then appear on the Impact screens of designated respondents, who either fulfill the request or assign part of it to other personnel, McAuliffe said. The system then tracks requests and responses, appending each individual's input to the report, and indicates when items are due or late.

Some of the functions that Impact offers may not be unique, however. Rick Crandall, president and CEO of Pilot rival Comshare, Inc. in Ann Arbor, Mich., claimed that his company's product, Commander, will allow an executive to set up certain kinds of reporting and to be alerted at times regarding changes in that reporting.

Impact will be available in the fourth quarter for a license fee of $18,000.



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EMC to ship 4M-bit chips before IBM

BY ROSEMARY HAMILTON
CW STAFF

EMC Corp. is scheduled to begin shipping add-on memory boards with 4M-bit chips for the IBM 3090 mainframe early next year, company officials said last week.

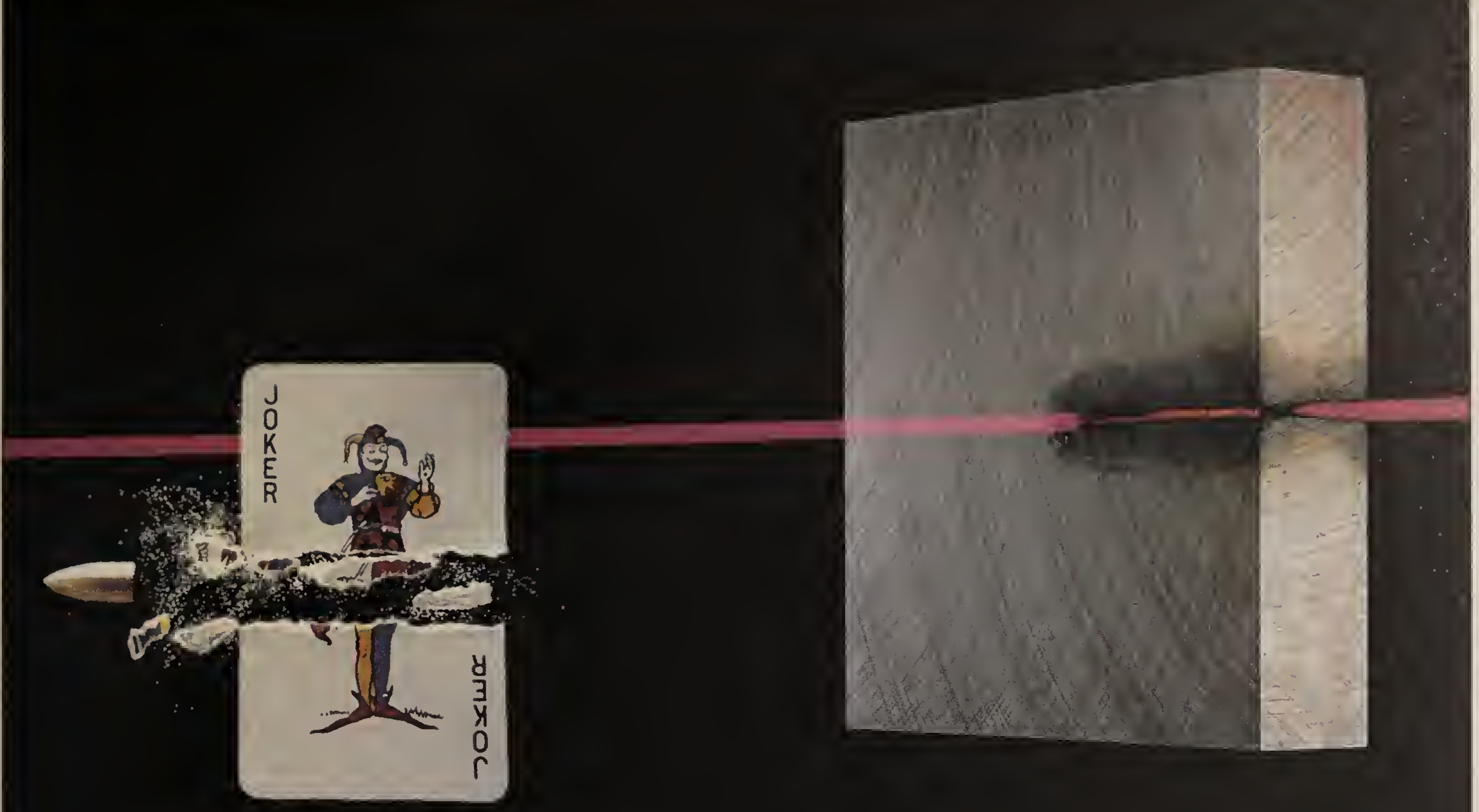
If EMC meets its goal, it could beat IBM in delivering 4M-bit memory chips for its mainframe line. IBM announced a 4M-bit memory option for its Personal System/2 in July but has yet to release a shipment schedule for the advanced memory chips with its 3090s or any other product line.

However, the 4M-bit chip, which IBM has been producing for several months, will eventually be incorporated across the IBM product line, a company spokesman said last week.

Toshiba Ltd. will supply EMC with the 4M-bit chips. Toshiba, which has also been in production with the chips, provides EMC with 1M-bit chips that it currently uses in its 3090-based products.

EMC will phase out the boards with 1M-bit chips as it ramps up production of the new boards next year.

An EMC spokesman last week said the 4M-bit chip prices from Toshiba are lower than originally expected, although he would not reveal the exact cost.



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DG offers New Wave package

BY STANLEY GIBSON
CW STAFF

WESTBORO, Mass. — Data General Corp. will dress up its CEO office automation package today with a graphical front end based on Hewlett-Packard Co.'s New Wave environment and Microsoft Corp.'s Windows/286.

Called CEO Object Office, the local-area network-based package requires a powerful MS-DOS-based desktop workstation and a DG MV host.

The announcement parallels that of IBM's Officevision earlier this year in that it includes a graphical user interface front end and a client/server architecture. However, while Officevision stresses workstations running IBM and Microsoft's OS/2 Extended Edition, CEO Object Office is firmly planted in the MS-DOS world. CEO Object Office also works with Token-Ring, Ethernet or Starlan LANs, while Officevision requires either IBM's Token-Ring or PC Network. Object Office is available today, while Officevision is expected to ship shortly.

The MS-DOS emphasis could be attractive to users who do not want to make the leap to the more costly OS/2. "MS-DOS has to be accommodated. There is more that IBM could have done, and DG has shown what more could be done," said Barbara Babcock, vice-president of office information systems at Gartner Group, Inc. in Stamford, Conn.

An important second phase of Object Office will unfold next year when a version ships for Unix servers and clients. That version will run on DG's Aviion line of Unix-based reduced instruction set computing systems. Support for Novell, Inc.'s Portable Netware is also promised for early next year.

Support for OS/2 lies in the future as well, according to Christine Wallace, DG's CEO marketing manager, although she would not say when that would be added.

From the Object Office screen, excerpts from MS-DOS-based applications written to Microsoft Windows can be cut and pasted between applications on the personal computer and between the PC and the host. Object Office takes advantage of a capability of New Wave's Object Management Facility called linking under which objects appearing in different documents can be updated simultaneously.

Unix platform to come

While today's announcement is sure to please current CEO users who long for a graphical look, new prospects will be more attracted to the upcoming Unix platform, said Christine Hughes at Myriad Research in Miami.

The CEO Object Office workstation must be a PC with an Intel Corp. 80386 or 80286 microprocessor, at least 3M bytes of Lotus/Intel/Microsoft 4.0 memory, a LAN card, a mouse, a 20M-byte hard disk and IBM's Enhanced Graphics Adapter or Video Graphics Array adapter and display. The Object Office server must run DG's AOS/VS operating system and Xodiac Transport Services.

CEO Object Office software must be purchased in addition to CEO software. CEO Release 3.11 or higher is required. The client software is priced at $400, including New Wave, while the server software sells from $375 to $4,335, depending on the size of the MV host.

The price tag for the hardware and software is less than that required by Officevision, which calls for OS/2 Extended Edition and some 8M bytes of memory for each user. Babcock said the desktop power required is in line with current buying patterns: "Users are buying mostly 386 boxes and more memory. 3M bytes is not that unusual. They are not talking about a price point that is far out of line with what's being spent."

DG also announced Intellibook Author and Intellibook Reader. Both products work with CEO Object Office.

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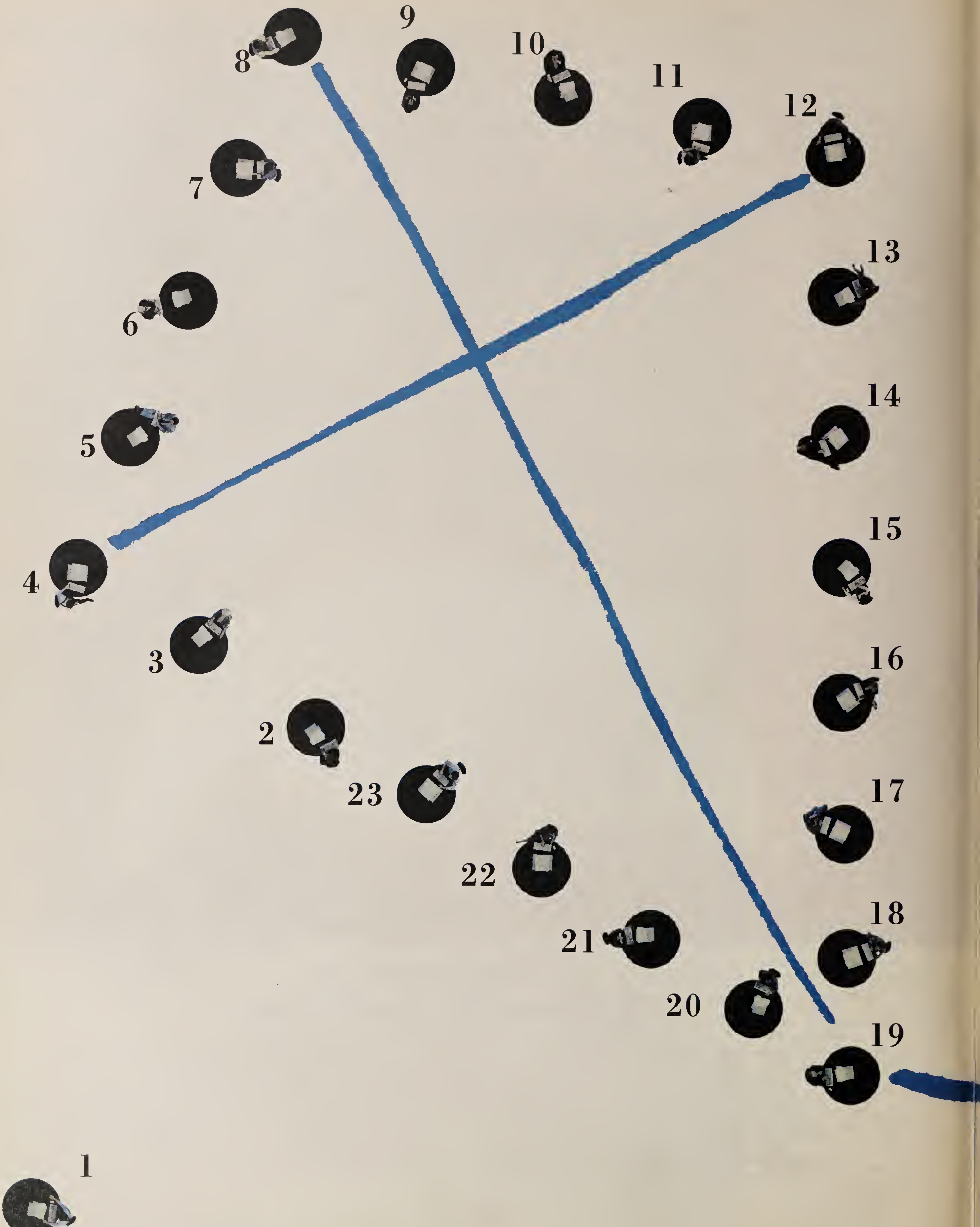
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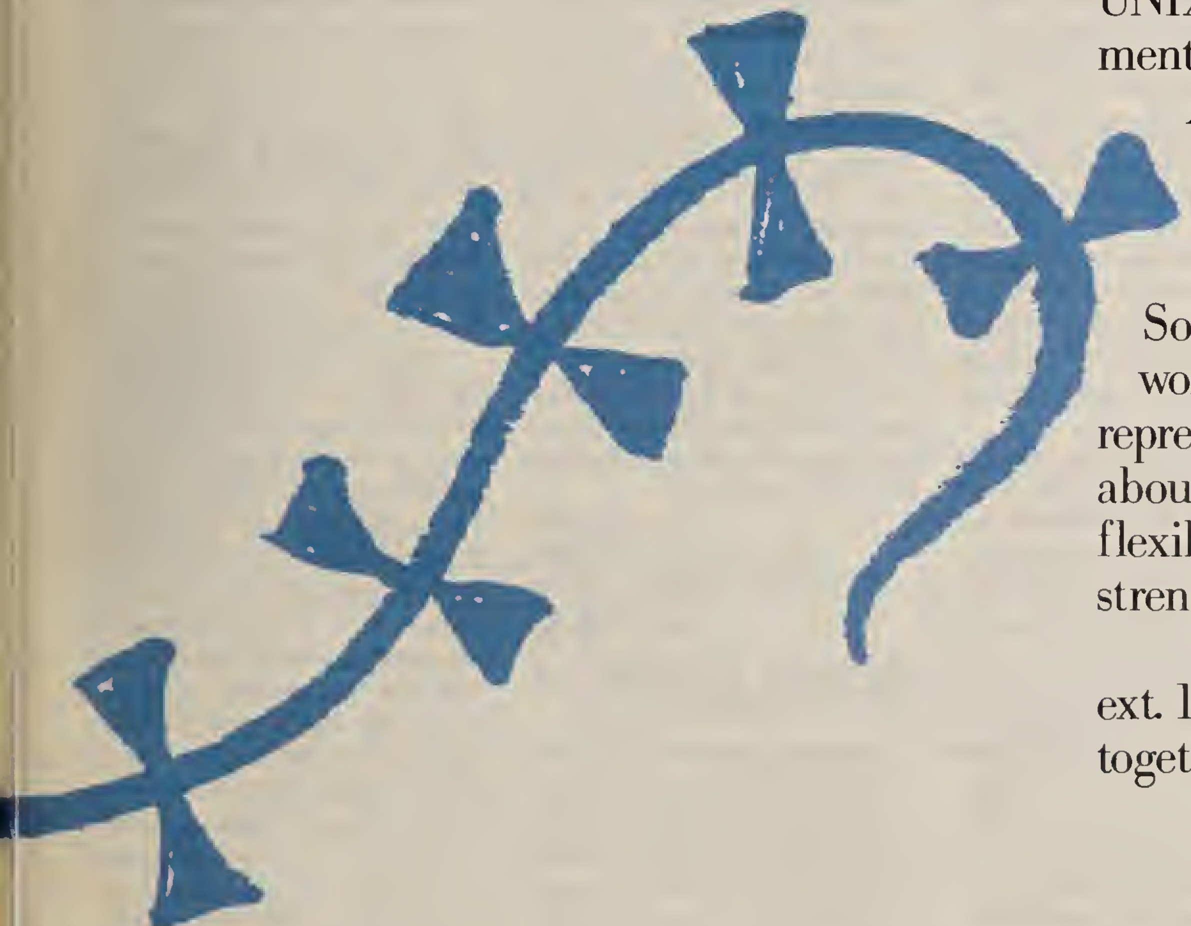

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EDITORIAL

Using the results

Some praise at morning what they blame at night,
But always think the last opinion right.
Alexander Pope

IT'S ALWAYS RISKY to rush to conclusions based on opinion surveys; they reflect but a moment in time, as many one-time presidential front-runners could attest.

With that said, we think that it is worth calling attention to the contrasts found between two *Computerworld* surveys: last week's Job Satisfaction Survey of 818 information systems professionals and our earlier poll on the perceptions of IS held by 100 top corporate executives [CW, April 17].

The surveys indicate that there is a major perception gap between chief executive officers and IS concerning the flow of useful business information.

A wide chasm exists between the perceptions among information systems staffers of the adequacy of business information filtering down from corporate decision makers and the feelings of 64% of the CEOs that their organizations could be getting more return on investment in information systems.

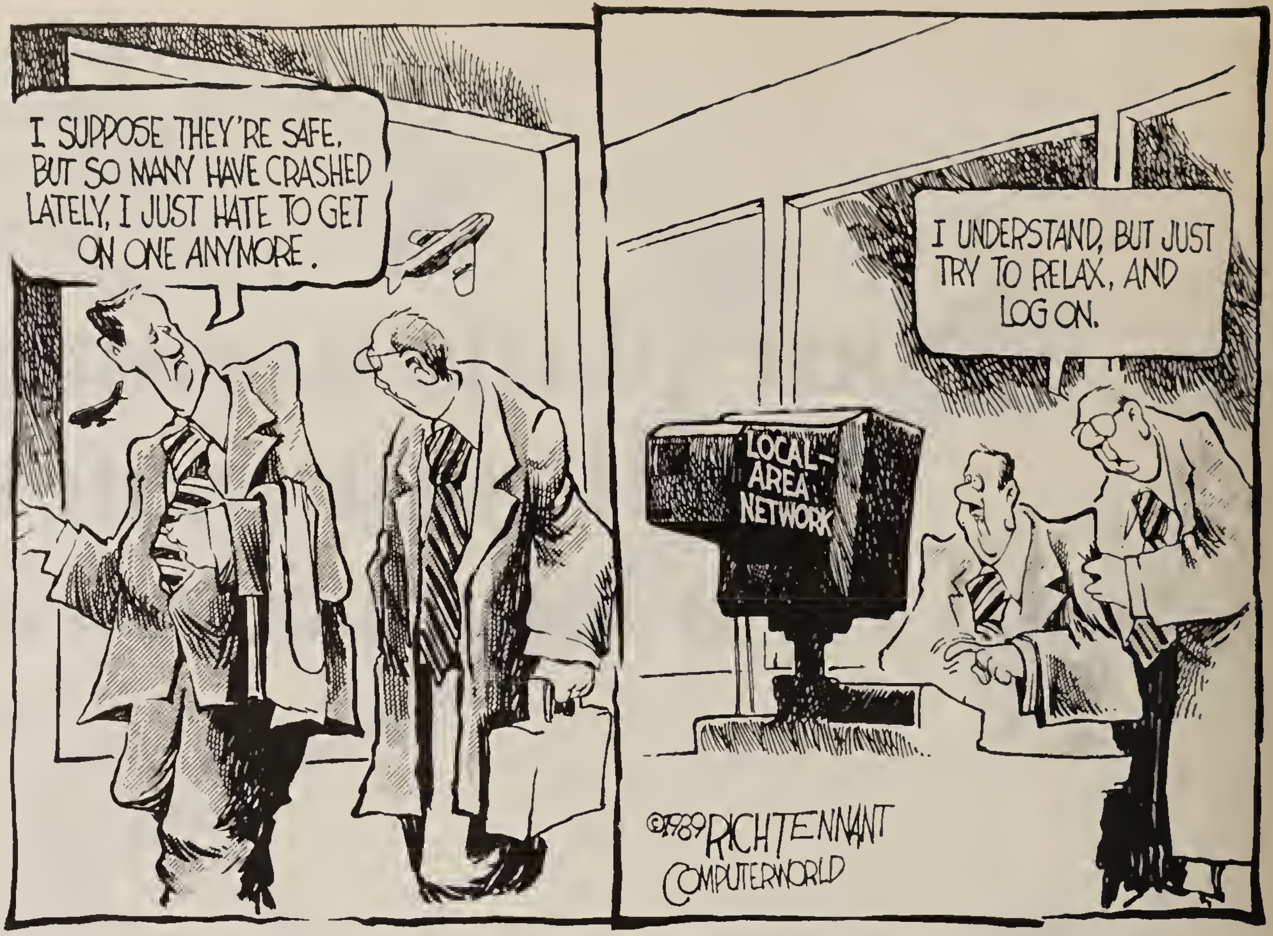
Fully 90% of IS professionals believe knowledge about their companies' business is becoming more important to them in the performance of their duties. (That one in 10 do not is amazing in this day and age.)

Of those who want to be in tune with their business, 51.7% said they are not happy with the resources that companies are providing to clue them in on business matters; 36% of all the survey respondents cited their biggest frustration as either ineffective management, poor communications with management or being too isolated from their companies' business.

Something is going on here, and it does not seem healthy. IS professionals and CEOs, the surveys indicate, are largely in agreement on the importance of information systems to future business success. Top management, however, seems to feel that their information systems workers are not really marching in step with company goals. The workers express frustration about the paucity of business information being passed down the line.

It would be naive to suggest that top executives and their IS staffs get away for a weekend encounter session. But the evidence does seem to indicate that some steps need to be taken to wed technology staffs more effectively with the business planning process.

Now, we are not about to suggest that Roger Smith, John Reed and the rest of their peers regularly troop around to glad-hand the technology staff. Rather, the initiative must be taken by top-ranking IS management, who should try to determine the extent of any philosophical chasm existing between their organizations and corporate goals and then develop effective bridge-building strategies.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LETTERS TO THE EDITOR

Remembering things past at RCA

Having been an RCA employee, both in the computer systems division and at corporate staff, William Harrison's Viewpoint column, "Learning a market strategy lesson" [CW, Aug. 7], touched a nostalgic nerve. It's nice to know that RCA's role in computers is not forgotten.

However, his interpretation of what happened is off. To begin with, RCA's strategy was to be an IBM plug-compatible vendor (in those days it was called a "second source"). The strategy was a good one, as evidenced by Amdahl and NAS for mainframes and the myriad of PC clone vendors. It didn't work for RCA for three reasons: 1) bad timing — it was too soon; 2) poor execution; 3) RCA's company culture did not fit the second-source role.

Paul Berger
Management Video Programs
Lawrenceville, N.J.

"Learning a lesson in market strategy" [CW, Aug. 7] used the RCA debacle as a positive approach to preparing yourself for a potential layoff. I have to take exception to several of the points noted in this article.

I was one of those managers that found out about the demise of the RCA Computer Systems Corp. that fateful Friday. First of all, no one on my level had any idea of what was going on. In fact, we had all been recently reassured, via a closed-circuit television presentation by the president of the company, that RCA was in it to the end.

When the end came that Friday, all middle-level managers were told to hang around after quitting time. After the bulk of the working force left for the weekend, we were herded into the vice-president's office, where we heard the news. We were then given lists of names of people to be told that they should come in on Monday to claim their personal belongings.

Harrison refers to "mindless and unimaginative RCA strategy." The main reason for RCA's exodus from the computer industry can be traced back to a complete lack of strategy. The corporate information systems director and his staff were so engrossed in making names for themselves that they did not consider alternatives until it was too late, and then they threw money around as if it was going out of style in an effort to establish some sort of direction.

The problems facing today's firms are not always poor management, as it was in the RCA fiasco. Financial conditions, taxes, technology and the overall business environment are frequently the blame for mergers, acquisitions and shutdowns.

Herb Gepner
Senior Associate Editor
Datapro Research, Inc.
Delran, N.J.

No pain, no gain

I'd like to comment on the issue of bundling database and communications software, which was raised as an antitrust issue in "IBM/DEC: Bundles of pain?" [CW, July 31].

I manage systems development, operations and maintenance on McDonnell Douglas hardware, running the Reality Operating System, a proprietary version of Pick. The entire system is built on the Pick file structure, which includes database management-style facilities such as hashed direct access and data dictionaries for files.

The integration of the database with the OS is what makes Pick so attractive. The single data model makes it simple for applications to communicate and read each other's files and for abstract applications (such as those that work with any file that has a dictionary) to be created.

So, if a product is a piece of junk, and yet is bundled, will it dominate the market? Doubtful.

If a product is good, and yet is bundled, is its domination of the market unjustified? Doubtful.

Will some installations use any product that comes from their computer vendor, regardless of merit? Probably. Who cares? There are always those who fail to make good or thoughtful purchases, and where is the role of the government in that? Nowhere, I hope.

Martin Goetz, I hope you and the others who fear IBM bundling will think about whether your products can't take the competition of a giant never known for innovation. Maybe you ought to be in another business if you need shelter from competition. If you can't provide the service and reliability that will allow you to keep your market in the face of competition, then maybe you ought to go to work for someone else.

Mark Cashman
DP Manager
Anacoil Corp.
Rockville, Conn.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

It's back to bundling for IBM

IBM WATCH

PHIL DORN

On June 23, 1969, allegedly responding to user pressures, IBM announced that henceforth IS managers would have to pay for software. The freebie era was over.

Thousands cheered. Well, maybe hundreds. Actually, only the infant independent software industry, the lawyers and Marty Goetz thought unbundling was a great idea. IBM's lawyers were pretty sure that unbundling was necessary because they heard that the Department of Justice was starting to make nasty noises, and they were trying to head off antitrust action.

Large IBM users accepted the new rules unenthusiastically. As there was no immediate budget impact because charges for software were delayed for the first few years, unbundling was put aside as a future problem. Only the universities understood the impact. They knew the days of casual experimentation and loading up systems with lightly used software were over. The erosion of IBM's university computing center business can be directly traced to unbundling.

Here we are, in a flash, 20 years later. The pundits were right about how lucrative unbundling could be. It created an industry with companies such as Computer Associates International, an independent software house with $1 billion in revenue. But the large hardware companies also reaped the benefits. In 1988, IBM raked in a staggering $8 billion in software revenue.

Even more startling, after two decades of separately pricing everything in sight, IBM is beginning to reverse course and move back to bundling.

Today, IBM sells the AS/400 computer system with its operating system and database management system completely wired in. If you have an AS/400, you run a factory-installed relational DBMS written by IBM. It cannot be bypassed, turned off or overwritten by a product from an independent software supplier. The AS/400 is not merely bundled — it is wired together and sealed.

BEATA SZPURA

Curiously, hardly anyone noticed, except for that ever-alert IBM watcher Goetz, who said, "Bundling is bundling. If it's something the user should be buying, bundling precludes something else." Goetz has a narrow, predictable view. More surprisingly, those users who knew what happened did not seem to care and appeared happy to buy bundled systems.

There is not the slightest evidence of any user protest. The Justice Department hasn't intervened or even expressed any interest. Congress isn't investigating. Adapso, the toothless tiger, growled a bit but nobody rallied to its side. Even the supremely aggressive sellers of independently developed relational DBMSs, who constantly flail each other and IBM, have been silent.

The AS/400 customers do not know if there are any possible alternatives or they don't care. Perhaps one reason customers are attracted to the AS/400 is the lack of a need to make software decisions. Users find it easier not to have to decide between conflicting claims or tempting alternatives.

The AS/400 design grew out of the efforts of a dedicated group of IBMers who refused to give up their product designs. This group was employed in the development of an IBM architectural effort known as Future Systems (FS), to develop a replacement for the obsolete 370 architecture.

Like many research and development projects, FS didn't quite become reality. The concept was too far out in front of the technology at the time, and there was no easy migration path for user software. FS went on the shelf as a corporate plan, but the stubborn design group, based in Rochester, Minn., did not quit. Eventually, an FS product, System/38, appeared.

System/38 was around for more than 10 years before Adapso and friends gave it a second thought. Although the System/38 had an RDBMS bundled in, it was only an odd little machine lacking 370 architecture, underpowered and seemingly doomed to a fairly short life.

In June 1988, something happened to IBM's ugly duckling; it grew up to be the AS/400, as lovely a swan as ever graced IBM's pond. The word went out to those who thought they won the bundling fight long ago: "It ain't over 'til it's over."

If IBM gets away with something, you can be sure DEC won't be far behind. Recently, DEC has been offering free run-time licenses for its RDB database management system packaged with VMS. In every sense this looks and smells like a clear case of the bundling ploy. Perhaps Adapso thinks DEC is an easier target because it has screamed about this situation.

After 20 years, the bottom line is that today, if you want software, it costs money — lots of it. Is it any better than 20 years ago? Charitably, let's merely say today's software is more sophisticated.

If ever the user community really cared about unbundling — a debatable proposition — it no longer expresses any interest in the operating system and utilities. Why? Because today users believe that all they ought to care about is applications.

If everything else is embedded in silicon, all the better, because it will run faster and cause less trouble. If IBM moves to more extensive rebundling, it will be surprising if any serious reaction results from the user community. If the AS/400 is the model, those who compete with IBM for software dollars are in for a rough stretch.

Dorn is president of Dorn Computer Consultants, Inc. in New York.

And then there was IS

PAUL GILLIN

In the beginning, there was DP.

And JCL did rule the earth, and plastic pocket protectors proliferated and Cobol jockeys did flock to the promised land of the data center, for it was air-conditioned.

And the chief executive officer looked down and said, "Let there be payroll," and coding sheets did fly and computers were fruitful and multiplied (and divided), but none were aware of the DP staff, for they dwelt in the land of ignorance and 360s. And none in DP were aware of the needs of the business, for they thought accounting was the Great Satan.

And IBM looked down and said, "There must be golden idols in this," and so it brought forth the end user, clad in the woeful rags of computer illiteracy. And IBM spake of the concept of the information center and decreed that henceforth mainframes would be "user friendly." And MIPS did dance before its great blue eyes at $100,000 a pop.

And lo, pop they did, for the mainframes were snapped up like gefilte fish at Passover and many cycles were wasted in the great flood of end-user computing, and informational graphics rained upon the land. And software did proliferate with kingly names such as Ramis and Nomad, and all the people got relational and multiplied. And all was good in the land. Except response times.

> AND ALL ACROSS the land, nameplates were pried off of data center doors and "DP" did go the way of the dodo, to be recast as "MIS," leading to rollicking puns such as "MISmanagement" and "MISinformation."

And all across the land, nameplates were pried off of data center doors and "DP" did go the way of the dodo, to be recast as "MIS," leading to rollicking puns such as "MISmanagement" and "MISinformation." The elders of MIS did take this in stride, for their pocket protectors were now lined with gold.

And uninterruptible power systems did flourish.

Then a great rain fell upon the glass house. It began as the first Apple was plucked from the tree, but soon became a torrent. And a prophet called Chaplin did emerge from the Valley of Hudson and said, "Lo, let there be goofy television ads that make computing look *easy.*" And a prophet that bore the name of a flower brought forth the 1-2-3 interface. And the end users rose up in rebellion. And cursors blinked everywhere, and a great plague of mice descended upon the corporate desktop. And the CEOs said, "Yea, these are no mere management tools. Let their files be served." And the MIS elders did say, "Hey, these are pretty good."

And micro-mainframe links multiplied, led by the prophet Irma. And the "Year of the LAN" dawned again and again. And the prophet Jobs rose in the West, followed by the pearly Gates who writ the Gospel according to Windows and was sued and martyred for it.

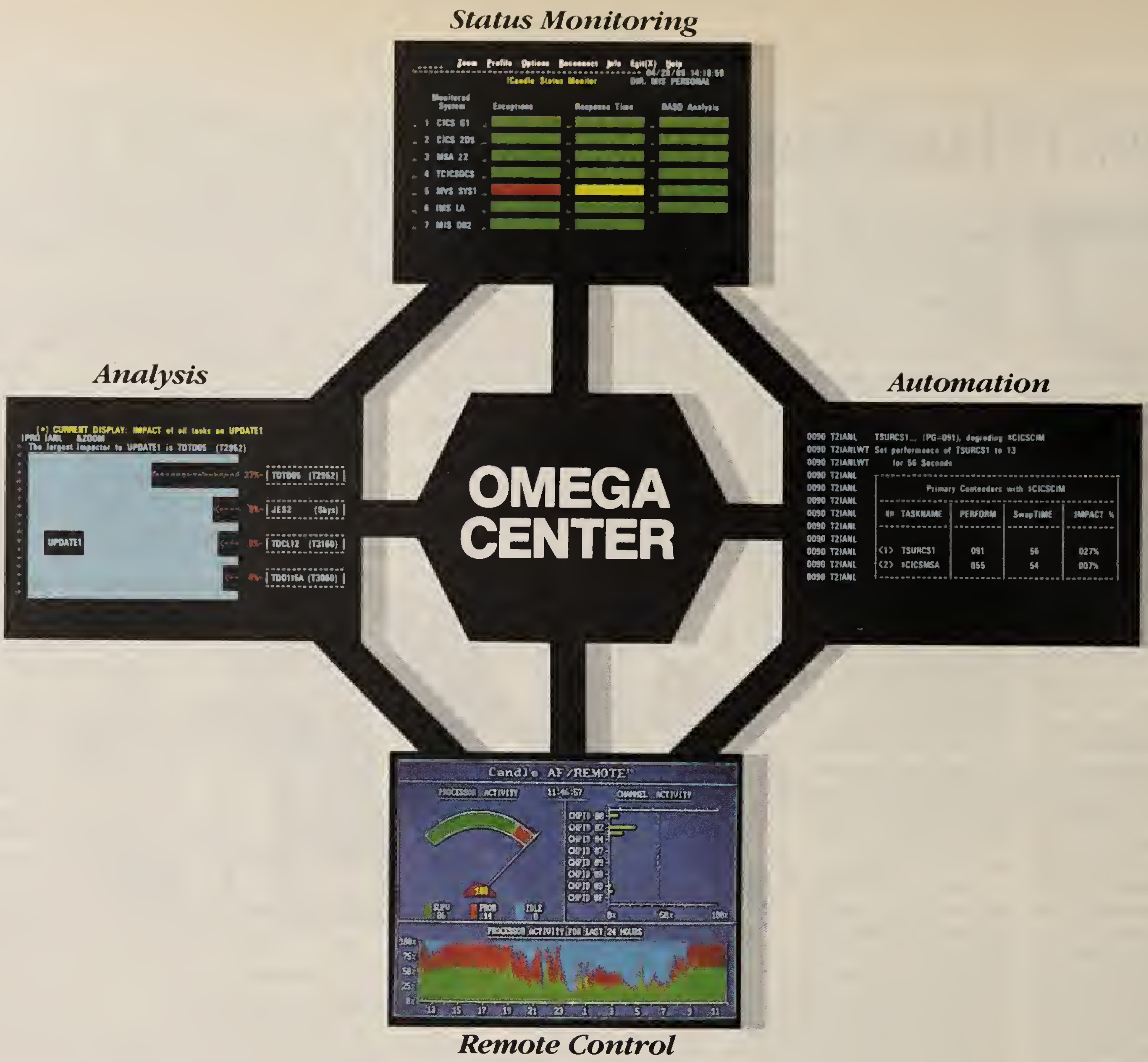
And still none bought the 9370.

And the sign painters were gleeful, and the headline writers did moan, for once again the nameplates came crashing down. For the "management" began to disappear from "MIS" leaving only "information systems" or "information services," depending on the valley from which you came. And a funny-looking acronym was created called "IS," which in headlines made it look like you were asking something loudly in poor English ("IS chiefs scoring budget wins"). Yet to some, it was called IT, which was deemed inappropriate by others, for it was the name of a character on "The Addams Family." Yet many schools of thought continued to proliferate in the land. And still Apple sued.

And the elders in the valley of *Computerworld,* who had by now become really comfortable with the term MIS, said, "Lo, go with the flow." And they met and rent their hair with their hands and lamented the woes of being in an industry where so much changes so fast. So they decreed that henceforth this journal shall bestow its favor upon the term IS and use MIS only in special cases such as titles and quotes. And thus you will see "IS" in these pages forevermore, unless it changes again.

And the people rejoiced and peace reigned upon the land. And the questions of the day were answered. Except what to do with 150,000 plastic pocket protectors.

Gillin is *Computerworld's* executive editor.



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HARD TALK

J. A. Savage

Baby, you can drive my car

Like the new Mazda Miata — the sleek new two-seat roadster that every yuppie seems to want for those few instances when it can be driven on a winding mountain road in the summer with the top down — computer servers are often just repackaged versions of workstations or minicomputers. Like the Miata, it's basically the same old engine underneath the new skin.

But vendors, like Mazda's management, see a brave new market out there, where their products will soon be expected to not only look like a sports car but act like one, too. It would be nice if their servers could sell for as much less than a minicomputer as a Japanese sports car does compared with a Porsche.

As the minicomputer market remains calm and most predictions for 1990 see general declines in the electronics industry, vendors are gearing up to flood the market with servers. And they may be more than repackaged minicomputers; they may be the first of the genre with a few Porsche-like components.

What vendors have been

Continued on page 31

SQL/DS users crave more tools

Third-party vendors more interested in high payback found with DB2

ANALYSIS

BY STANLEY GIBSON
CW STAFF

Although IBM's SQL/DS preceded its relational DB2 cousin to market, it cannot compete with DB2 in holding the interest of third-party tool vendors. That has left some users, many of whom long for better SQL/DS performance as well, pining for a wider selection of third-party utilities.

Despite the fact that there are more SQL/DS licenses (some 6,000 spread throughout the installed base of VM and VSE operating systems) compared with DB2 licenses (about 4,000 under MVS), software vendors typically gravitate to DB2, whose MVS-based users are willing to pay more than those running VM or VSE.

"I would like to see more performance monitoring tools under VM, VSE or both," said Jerry Bruce, database administrator at Seven-Up/Royal Crown of Southern California in Los Angeles. Bruce, who runs SQL/DS under both VSE and VM, said that he has no way of knowing about levels of activity and usage patterns in SQL/DS.

Bruce runs a system that monitors sales trends of the soft drinks that his firm distributes. Users, primarily sales managers, can extract information from the SQL/DS-based application in a variety of screen formats.

Another user at an electronics company in the eastern U.S. said he would like a performance monitor as well. He has filled what was once a lack of SQL/DS referential integrity with a tool sold by Intex Solutions, Inc. in Needham, Mass. He said he started using that tool before referential integrity was offered as part of SQL/DS Version 2.2, which began shipping late last year.

"DB2 is a glamour kind of product, and you can get more money for it," said Rich Finkelstein, a database consultant in Chicago. Vendors reason that it would cost about the same to develop for SQL/DS as it would DB2, but the amount they could charge for an SQL/DS utility would be much less. Some ground, however, could be made in larger volume and greater market share because fewer competitors and a few software vendors such as Intex have smelled the opportunity and rushed to fill the void.

VM Systems Group, Inc. in Arlington, Va., recently introduced a performance monitor that it claims is the first on the market. It also has a full-screen application designer under which Rexx can be used to develop an application. Other vendors have deferred SQL/DS development plans for the future.

"We are not writing for

Continued on page 27

DG's Aviion: Hospitals seek it as IS remedy

BY MARYFRAN JOHNSON
CW STAFF

WESTBORO, Mass. — Data General Corp.'s new line of Aviion workstations, servers and systems is moving briskly into its own niche in hospitals and research settings.

DG is also working to overcome a traditional hurdle facing reduced instruction set computing (RISC)-based machines — a lack of software — with recent announcements that bring the total number of software vendors allied with the computer company to 35.

Aviion 6100 servers began shipping this month to sites such as the Hamilton Civic Hospital in Ontario and Frederick Memorial Hospital in Frederick, Md.

At Hamilton Civic, data processing manager Jean-Claude Carriere was waiting as impatiently as an expectant father. "This has been a 15-month wait for me," Carriere said, explaining how the news of DG's alliance with Motorola, Inc. last year initially drew his attention to the new generation of RISC-based machines running on the Motorola chip.

Hamilton Civic and its sister hospital, Anderson Civic, have a total of 1,100 beds. They also share an overloaded computer system based on four other DG machines from the proprietary MV line.

Information sharing

The addition of servers will enable the hospitals to set up an integrated local-area network, with 400 terminals added to the current 300. It will also automate hospital functions in the lab, nursing stations and offices, enabling systemwide information-sharing never possible before.

Discharging a patient, for example, will require one computer entry rather than phone calls to nine different hospital departments. "We may not save people's lives, but we will have people under better work conditions, with less frustration," Carriere said.

The choice of the new technology saved an estimated 30% of the total project cost — about $1 million in Canadian currency — allowing him to cut maintenance costs, and provide more computing power and storage space, Carriere said.

Continued on page 28

Inside

- Obsolete IBM compatibles are not so obsolete for some users. Page 25.
- Performance remains an issue as users evaluate IBM's SQL/DS. Page 27.

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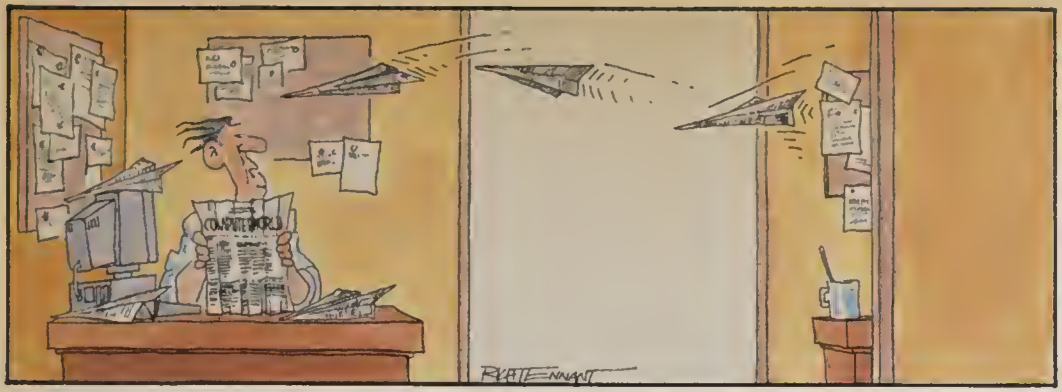

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22. Dir Mgr Suprv of Operations, Planning Adm Services
23. Dir Mgr Suprv Analyst, of Systems
31. Dir Mgr Suprv of Programming
32. Programmer Methods Analyst
35. Dir Mgr , Suprv , OA/WP
38. Data Comm Network/Systems Mgt

OTHER COMPANY MANAGEMENT
11. President Owner/Partner General Mgr
12. Vice President/Asst VP
13. Treasurer, Controller, Financial Officer
41. Engineering, Scientific R&D Tech Mgt
51. Sales/Mktg Mgt

OTHER PROFESSIONALS
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70. Medical, Legal Accounting Mgt
80. Educators Journalists Librarians Students
90. Others ________
(Please specify)

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- B. Minicomputers/Small Business Computers
- C. Microcomputers/Desktops
- D. Communications Systems
- E. Office Automation Systems
- F. No Computer Involvement

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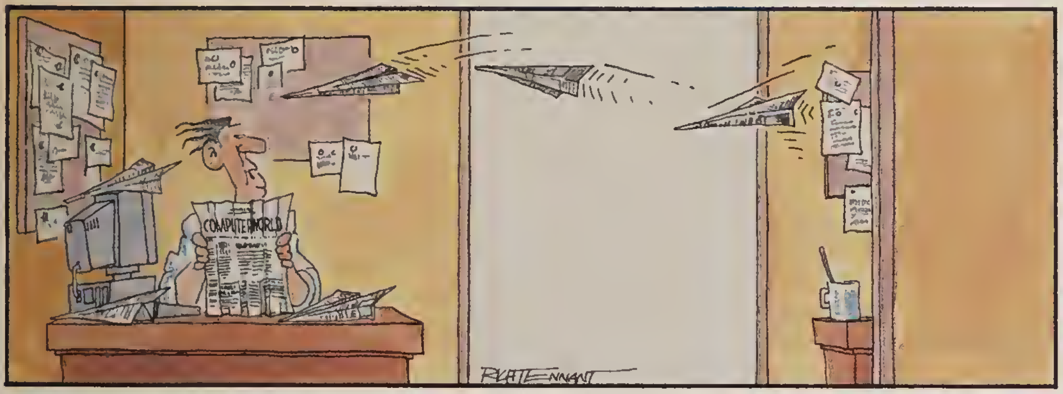
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65. Communications Systems/Public Utilities/Transportation
70. Mining/Construction/Petroleum/Refining/Agric
80. Manufacturer of Computers, Computer-Related Systems or Peripherals
85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
90. Computer/Peripheral Dealer/Distributor/Retailer
75. User Other ________
95. Vendor Other ________
(Please specify)

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21. Dir , Mgr , Suprv , IS/MIS/DP Services
22. Dir , Mgr , Suprv , of Operations, Planning, Adm Services
23. Dir , Mgr , Suprv , Analyst, of Systems
31. Dir , Mgr , Suprv , of Programming
32. Programmer, Methods Analyst
35. Dir , Mgr , Suprv , OA/WP
38. Data Comm Network/Systems Mgt

OTHER COMPANY MANAGEMENT
11. President, Owner/Partner, General Mgr
12. Vice President/Asst VP
13. Treasurer, Controller, Financial Officer
41. Engineering, Scientific, R&D, Tech Mgt
51. Sales/Mktg Mgt

OTHER PROFESSIONALS
60. Consulting Mgt
70. Medical, Legal, Accounting Mgt
80. Educators, Journalists, Librarians, Students
90. Others ________
(Please specify)

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- B. Minicomputers/Small Business Computers
- C. Microcomputers/Desktops
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SOFT TALK

Daniel O'Connell

Razing structured approaches

For many years, most software development projects relied on design methodologies that used the top-down or structured approach.

Such methodologies — the Jackson design method, for example — work quite well for most business applications but are not well-suited for technical or scientific projects. Object-oriented design, however, promises real improvement in the design of technical systems such as compilers, communications protocols and operating system utilities.

The top-down approach assumes that all software systems have hierarchical relationships, which can be graphically represented through structure charts, data-flow diagrams and the like. Terms like "boss" and "worker" are frequently used in these methodologies.

Here is the problem: In many technical software projects, hierarchical relationships are not easily determined and indeed may not exist. For example, one can easily represent a payroll system through a series of modules drawn on a structure chart with higher level modules controlling those at a subordinate level. However, what if

Continued on page 28

The wrong horse to bet on

They served well, but these IBM plug-compatibles have had their day

BY ROSEMARY HAMILTON
CW STAFF

For many users, an era ended this year when they threw in the towel on obsolete IBM-compatible mainframes made by forgotten computer makers with such names as Magnuson Computer Systems, Inc. and IPL Systems, Inc.

But these systems — the mainframes that couldn't — apparently did provide several good years to their small user populations. Most users interviewed recently said they had long been happy with the hardware itself. But they finally gave in because they needed more capacity or were unhappy with their third-party maintenance provider.

"We got five years out of it, and that's about all I can expect," said Andy Jensen, MIS director at Emco Distributors in Fremont, Calif., where IPL hardware was recently replaced by a used IBM 4341.

A few users, in fact, said they expect to get another year out of these small mainframes before they must move to a bigger system.

One user does not see any end for his Magnuson: It is now being used strictly as a table for operator consoles. But Frank McMurry, vice-president of Gateway Information Services, Inc., a service bureau, said the Magnuson served its purpose before becoming a piece of furniture four months ago.

"We could have gone to VM [on the company's IBM-compatible equipment] and run DOS under that, but keeping the Magnuson was cheaper than that," McMurry said. "We were using it for some DOS compiles, but lately it was becoming an expensive luxury for six or seven compiles a year."

Other users have found that their outdated equipment actually has some use for their firms. "It doesn't cost much to keep it, and it just stays tucked in the corner, humming away," said Michael Stamp, vice-president of technical services at Computations/Dyer Wells, Inc. in Atlanta, where a Magnuson system is used to support an external client who requires the IBM VM and VSE operating systems.

This old Magnuson *mainframe has been 'tabled'*

These and dozens of other users were among a group that took a chance on the wrong plug-compatible manufacturer (PCM) in the late 1970s and early 1980s. Magnuson and IPL were among an ill-fated collection that included Cambex Corp. and Spartacus Computers, Inc. They all had two things in common: They tried to compete with IBM on the lower end of the mainframe market. And they all failed.

But they bailed out in different ways. Some were bought up by other companies. Magnuson, for instance, was taken over by Global-Ultimac Systems, Inc., which itself faded away. Others, such as IPL and Cambex resurfaced in other businesses such as the memory add-on market.

While hundreds of other users have long been associated with more successful PCMs such as Amdahl Corp., members of this group found themselves committed to a company that did not have the strength to compete with IBM. In other words, they were dumped.

But these users now say that being hitched to a loser is not necessarily a catastrophe.

"It lasted for its life," said J. A. Marshall, director of data processing for the city of Fort Worth, Texas, of an IPL system that was retired from his office six months ago. "It was a good machine, and we just reached the point where we needed to upgrade. Nothing was wrong with it at all."

Several users' sites were small enough that their systems offered enough computing capacity for several years after the vendor faded from the computer business. In other cases, they designated the obsolete machine for a specific task so that they were not dependent on it for day-to-day operations but still got some use out of it.

The only problem cited by some users was maintenance. In several cases, users signed up with a third-party provider that took over the maintenance responsibilities for the dying mainframe suppliers. Most of these users reported no big problems with the changeover, but a few said the third-party provider just did not have the expertise for the discontinued system.

Still others said they took on the maintenance themselves. In at least one case, the in-house maintenance became too much of a burden and contributed to the decision to finally scrap the system.

Emco Distributors is one site that was unhappy enough with its third-party maintenance provider to move to a used IBM mainframe.

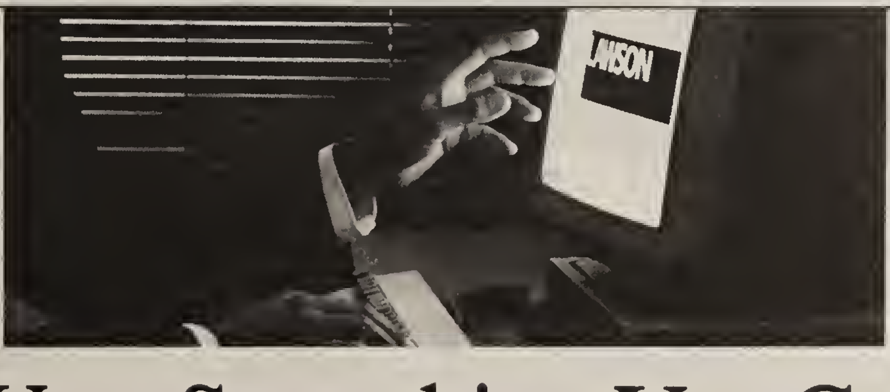
"The system was very good," Jensen said of the small IPL mainframe that was sent out of the company's warehouse last year. "The problem was when it did break, Sorbus couldn't fix it."

Jensen said he tried working with both IPL and Sorbus, Inc., the third-party provider that took on the IPL maintenance responsibility, to get better service, but those attempts failed. He claimed that Sorbus did not provide IPL expertise in the San Francisco area where Emco is located; as a result, every system problem became a major headache.

"I went through nothing but grief. I finally said, 'That's it,' and I put in a 4341," Jensen said.

A Sorbus spokeswoman said the company made its best effort to meet Emco Distributors' requirements but that, in its opinion, the customer's demands were unreasonable.

Continued on page 31



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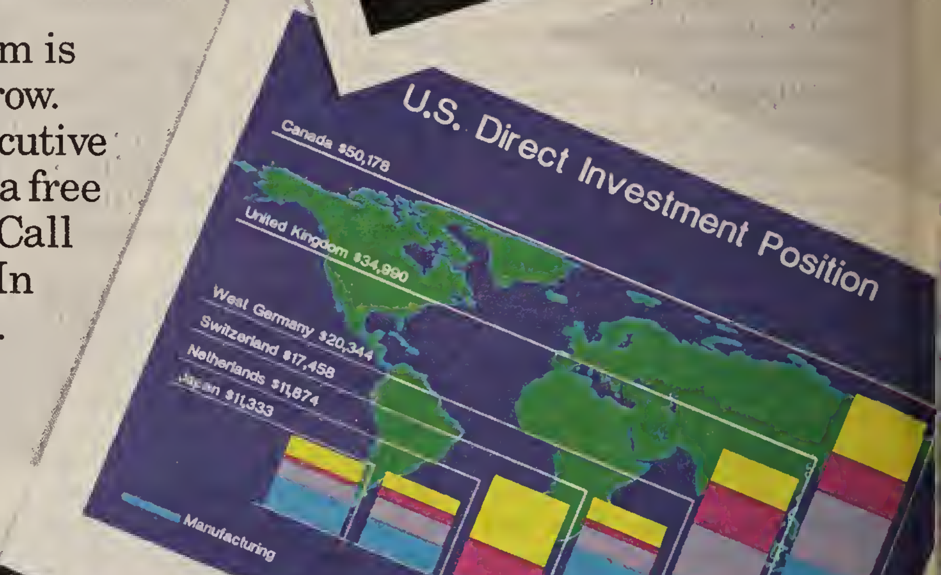

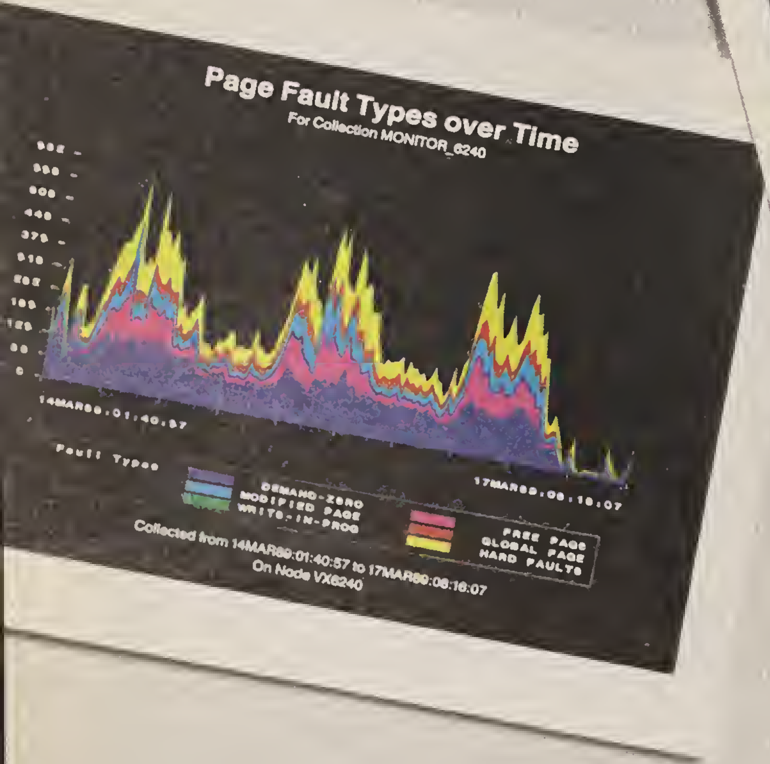

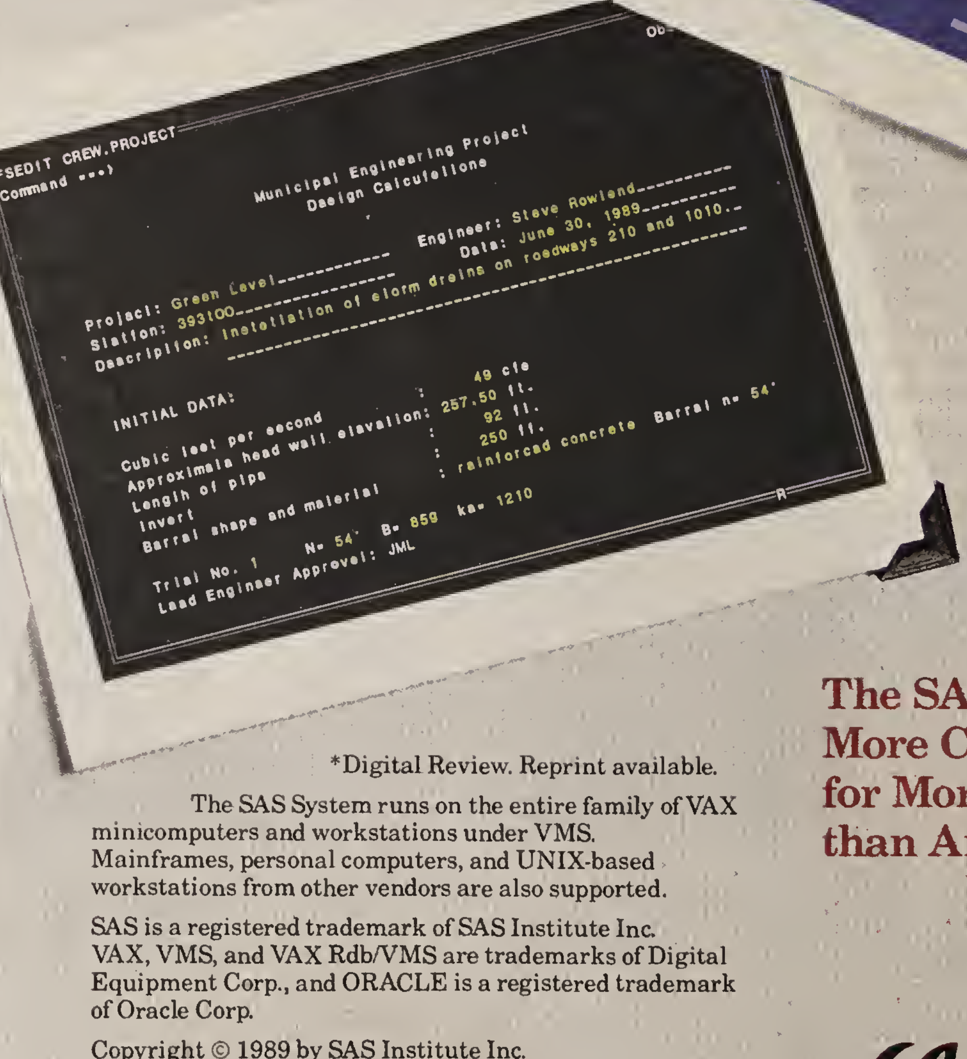

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                         Municipal Engineering Project
                              Design Calculations

                                        Engineer: Steve Rowland__________
Project: Green Level___________             Date: June 30, 1989__________
Station: 393100________________
Description: Installation of storm drains on roadways 210 and 1010._
             ______________________________________________________

INITIAL DATA:
Cubic feet per second               :      49 cfs
Approximate head wall elevation:       257.50 ft.
Length of pipe                      :      92 ft.
Invert                              :     250 ft.
Barrel shape and material           : reinforced concrete   Barrel n= 54'

Trial No. 1        N= 54'   B= 859   ka= 1210
Lead Engineer Approval: JML
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*Digital Review. Reprint available.

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Command performance

William White, computer center director at Rockford College in Rockford, Ill., wanted to use SQL/DS for in-house programming but changed his plans.

Instead, White opted for CICS under VSAM because SQL/DS required additional disk storage and did not provide satisfactory performance. IBM helped to tune SQL/DS performance but was unable to improve it sufficiently, White said.

"We've done a complete 180 in the last three or four years," he said. Instead of doing all development on SQL/DS as he once intended, SQL/DS may be kept only for query needs, he said.

While SQL/DS opens up relational avenues formerly closed to many users, some — like White — complain performance does not meet their needs.

Steven Rose, director of information services at United Way of America in Alexandria, Va., said dramatic performance swings are a major issue in his use of SQL/DS. "We're not happy with SQL/DS as an on-line interactive tool. I'm hoping that there will be some kind of high-performance option for SQL/DS," Rose said. "If you don't build indexes properly, you can have problems. You have to work hard to optimize."

George Hettinger, director of database services at Kraft, Inc. in Glenview, Ill., said SQL/DS is effective for small usage but not for large databases.

"Our view is that it had major performance problems when we tried to do large things," Hettinger said. For that the company bought a Teradata Corp. database machine that, he said, "blew away" SQL/DS in benchmark tests.

Hettinger said he plans to move his SQL/DS applications to DB2 within five years.

Phil Reese, a systems consultant at Ball Corp. in Muncie, Ind., is using SQL/DS under VM for ad hoc queries and said that users are happy with IS performance.

Reese said that at a recent Guide International Corp. meeting, an IBM representative made negative comments about SQL/DS' performance under VSE, pointing out that it would use a lot of memory and easily hit VSE resource limits.

Some performance relief should be on the way when ESA capabilities are added to VM next year.

Russell Donovan, IBM database marketing manager, said SQL/DS under VM could gain from ESA in the same way DB2 does. He said the task manager and cross-memory services improve DB2 performance under MVS/ESA by about 10%.

STANLEY GIBSON

SQL/DS

CONTINUED FROM PAGE 23

SQL/DS, although we will probably be forced to do something like we did for DB2," said Charles Riegel, director of product marketing at Business Software Technology, Inc. in Westboro, Mass. BST makes change-control software for MVS-based systems.

BMC Software, a vendor of DB2 utilities in Sugar Land, Texas, considered writing for SQL/DS but rejected the idea, believing that more than half of SQL/DS users are running on VSE and that most of those are in Europe. "But even the VM side is not that lucrative," said Sonja Cordell, director of product development at BMC. Cordell added that BMC does not believe that SQL/DS is "industrial strength." She mentioned one user's 20-million-row application that was failing. Cordell noted that 20 million rows is not large for a DB2 database.

The dearth of third-party utility support is reflected in less consultant attention as well. "SQL/DS has never had the consultant support, either. There are very few books on it," Finkelstein said.

Finkelstein said that the lower profile of SQL/DS is partly IBM's doing: "IBM has really been downplaying SQL/DS." He wanted to start an IBM SQL user group in Chicago four years ago, and IBM told him not to include SQL/DS users, only DB2 users. "IBM has considered DB2 more strategic for some time. IBM supported SQL/DS out of necessity. Some people just couldn't afford DB2 and MVS," he said.

> "IBM HAS CONSIDERED DB2 more strategic for some time. IBM supported SQL/DS out of necessity."
>
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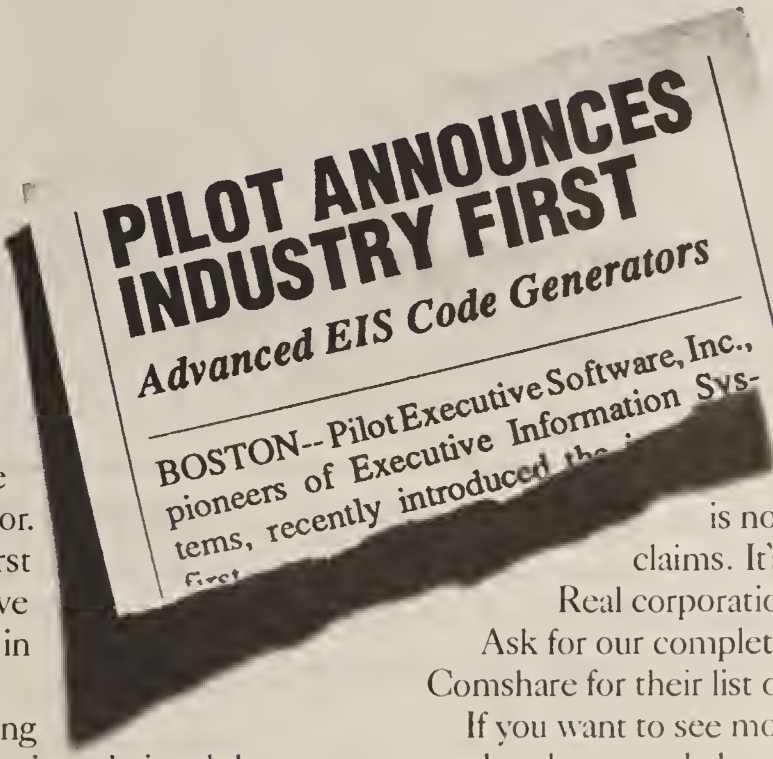

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PILOT
EXECUTIVE SOFTWARE

O'Connell

CONTINUED FROM PAGE 25

the system to be constructed is a concurrent C compiler? It would be difficult to represent this system with a structure chart. One cannot easily represent a communications protocol or concurrent operating system facility using such tools. Like a tight pair of shoes, the methods just do not fit.

In technical projects such as these, the data structures being manipulated and passed between components are the key to developing a functional system. For this reason, the object-oriented approach works well for these systems. Using this method, a designer would view the components of the system as objects and object classes, which the system manipulates.

An object is a specific value within a class — *Professor Jones* would be regarded as an object. A class, however, is a set of all like objects — *professors* is a class in this example.

Let's take the accepted programming notion of a queue, a data structure that is to be processed in certain defined ways. By adding functions in the queue, we can turn it into an object-oriented class.

We can add such functions as *Enque,* add an element; *Deque,* remove an element; *Fullque,* check to see if it is full; and *Emptyque,* check to see if it is empty. The queue, now a class, would be declared as a data type containing the defined functions Enque, Deque, Fullque and Emptyque.

With the object-oriented approach, we view the class in terms of the services provided by that class without involving the physical implementation — that is, array, pointer, etc. What we are doing, in fact, is taking an abstract data-type approach. In this way, we can view object-oriented design as a method of constructing a software system by implementing a series of well-defined classes.

In reality, a computer system manipulates data structures. We have simply defined them as classes of objects to allow flexibility in the choice of the physical implementation. Viewing a software system in this manner, we can handle all software projects and not just those that can be represented hierarchically. Notice that complex concepts such as concurrency can be handled using this approach. This is important, considering the industry's trend toward massive parallelism and the use of concurrent programming languages such as Ada.

Classes relate to one another. Each class has a number of services from which other classes may choose. This mechanism provides a powerful design tool for most software projects. For example, modern computer operating systems are built upon a client/server model. If an operating system process requires a specific service, it requests the service from the appropriate server software. Each server would be a class of objects that could provide the requested service.

Although not yet widely accepted, the object-oriented approach appears to offer great improvements over current methodologies.

O'Connell is an assistant professor of computer science at the State University of New York at Fredonia and a database consultant.

Aviion

CONTINUED FROM PAGE 23

Dollar savings and performance were also a drawing card for Frederick Memorial, which spent "just over $2 million" to revamp its computer system, said Tom Powers, the hospital's director of data processing.

The 233-bed hospital will begin later this month to install four 6100s, each hooked up to an Ethernet LAN for up to 300 terminals. The Aviions will replace the present odd mix of hardware, which is scheduled for mothballing.

At the Ontario and Maryland hospitals, the laboratory, nursing station and office automation software comes from Medical Information Technology, Inc., in Westwood, Mass.

Maintaining an environment compatible with Meditech software was a key element in choosing DG, the managers said. The 25 various hospital applications from Meditech also run on Digital Equipment Corp. machines, but DEC's RISC line was not introduced until July.

Both data processing managers did their performance analysis on the Aviion 5100 at Meditech's headquarters, which served as a beta-test site for the processors.

At Carnegie Mellon University's Center for Excellence in Optical Data Processing, Ph.D. candidate Etienne Barnard is finishing his thesis using the Aviion 300 workstation.

The electrical and computer engineering student chose the Aviion machine over Sun Microsystems, Inc.'s Scalable Processor Architecture station and the Decstation 3100 because it packed "more computational power." But Barnard added that he is waiting for a wider choice of software.

American Medical International, one of DG's largest customers, is looking more closely at the Aviion line even as its Los Angeles-based data center upgrades to DG's proprietary high-end MV40000.

"The appeal is the performance of the [RISC-based] machine," said Scott Ward, a senior systems programmer. "But the concern is moving [DG's] AOS/VS into the Unix-based environment. You can't do that now."

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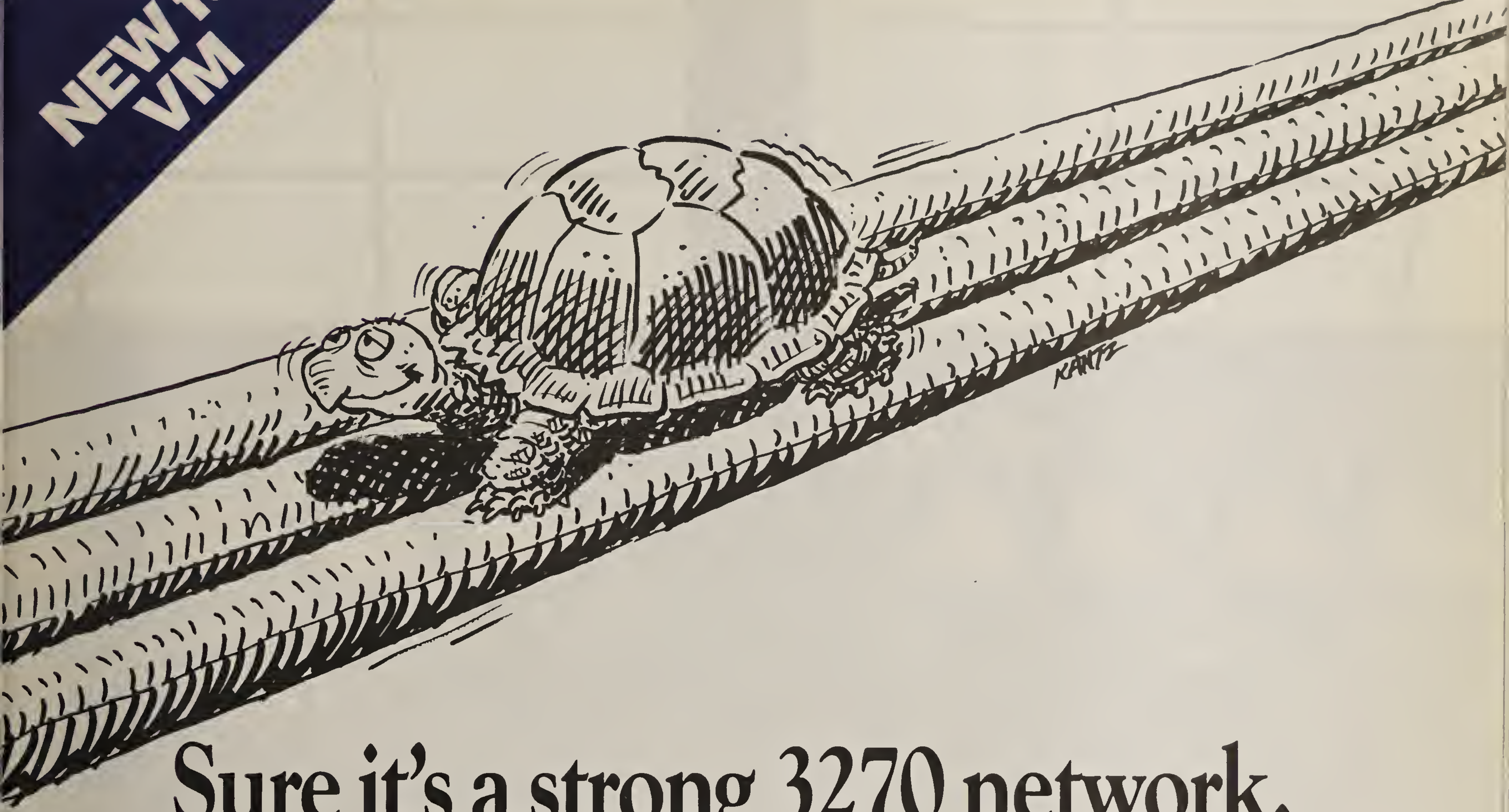

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Savage

CONTINUED FROM PAGE 23

doing for the last year or so is to take the guts of a workstation or minicomputer, add networking software, repackage it in a tower and create a server.

In doing so, prices and capabilities range wildly. No one in the industry seems to have a handy standard definition of what a server is and what it should do. But as vendors rush to fill the growing market, classes of servers will start to form.

The newest class will be the Porsche-like servers streamlined to do only server functions — not repackaged minicomputers.

Soon — probably first in a half-dozen start-ups by the end of the year — you'll see servers with some specialized hardware such as channel processors to handle protocol conversion, leaving CPUs to manage memory. One of these is made by Netframe Systems in Sunnyvale, Calif. It incorporates Intel's 386 chip in two models designed to be Netware servers.

Similarly, workstation vendors, such as Sun and Compaq, will move up in the systems market by putting their workstations in a network server environment.

Dataquest's finger-on-the-pulse indicates there will be many new server products by the end of the year as product lines, which now often include only one product, are broadened. This is because corporations want their users to share resources rather than dedicate them to isolated individuals.

Now, as repackaged minicomputers, servers have too much capability, according to some who make minicomputers such as Hewlett-Packard. To be cost-effective, the mini will be stripped down.

As the hardware slims down and specializes, the cost will slim down too. Wim Roelandts, vice-president and general manager of HP's Computer Systems Group, predicts that in two or three years, servers will be half the price they are now. Servers currently run the gamut, between about $12,000 to $125,000.

In addition to specialized CPUs, expect servers to have specially built cards for graphics, high-speed computation, printing, files and databases.

Not every vendor expects to be swept up in the sports car server line. Mips Computer, one of the early entries in the server market, is reserved. It could streamline but sees no need to; instead, Mips will be goosing the power of its current line because new server software will gobble up horsepower.

Nevertheless, servers are evolving rapidly. International Data Corp. analyst Don Bellomy reminded me that a couple of years ago, servers were minisupercomputers doing the heavy computation work for individual workstations. These days, the action is in commercial applications.

The cap on the server market is that corporations are likely to be conservative in using networks. Sure, a work group or office should be tied together, but how many work groups should be able to share the same data? Then, of course, the office political agenda comes into play, in which management doesn't want to share what has been developed in one area with another group that could leech and leverage from the information.

Savage is a *Computerworld* West Coast correspondent.

Wrong horse

CONTINUED FROM PAGE 25

The Houston Post disconnected its Magnuson computer this summer after years of relying on in-house maintenance. "We just ran out of computing power, plus it became almost impossible to maintain," said MIS Director Harry Wilson.

Wilson said the company first went with Magnuson in 1980 and encountered no big problems when Global took over: "Things didn't really change. They didn't make new machines, but they were still providing service."

Then, when Global went out of business, the *Post* hired one of the company's field service representatives to take care of the computer in-house. That worked for a while. Spare parts were easy to come by. Eventually, Wilson's department had tied four Magnusons together.

"We had a good system going, plus we owned it, so you can't get much cheaper than that," Wilson said.

In the last few years, however, the aging Magnuson became more difficult to maintain. Also, additional capacity became a more pressing concern. The two issues together led the *Post* to decide on an IBM 3081 as a replacement.

Not done yet

Other user sites, however, say their obsolete equipment has at least several more months to live.

Stamp at Computations/Dyer Wells said he expects to keep his Magnuson until at least the end of this year. He said the Magnuson plays a solid secondary role to an IBM 4381; the company set up its key IBM MVS accounts on the 4381 and assigned VM and VSE accounts to the Magnuson because there are fewer of them.

"We IPL it about once a year and it runs," Stamp said. "We've had problems with the console just wearing out, but we can pick up a replacement for a few hundred bucks."

Stamp said the cost to maintain the Magnuson is low. Having paid for it in full, he has no monthly leasing charges.

Before System 1032, 24 years and 1 trillion bits of interplanetary data were lost in space.

Dr. Raymond Arvidson
Chairman, Magellan Data Products Group
Member, Magellan Radar Investigation Group

When the recently launched Magellan space probe reaches Venus in the summer of 1990 to map the planet's surface, it will collect more than 1 trillion bits of data. That's more information than gathered from all the previous planetary probes combined.

According to Dr. Raymond Arvidson of Washington University in St. Louis, the successful use of this new data all gets down to System 1032 from CompuServe Data Technologies.

"Our System 1032 database is the only one in the world that does what it does," said Professor Arvidson.

As Arvidson discovered, System 1032 4GL/RDBMS software readily handles his record-breaking amounts of data at record-breaking speeds. Smoothly. Easily.

Along with the team from the Department of Earth and Planetary Sciences, Arvidson uses System 1032 to catalog and access vast amounts of digital data from past and present missions. Currently, the database includes information about 150,000 images and 500,000 photoproducts.

Before System 1032, 24 years of data weren't cataloged or readily accessible. So trying to find a particular image could not only take weeks, it might not be found at all.

Using System 1032's browse capability, the database can be easily searched and data quickly displayed. For example, a data search that might have taken 40 hours before System 1032, can now be done in just seconds.

If your large, sophisticated RDBMS application leaves you lost in space, here's how to find the answer: Think Big. Think Fast. Think System 1032 from CompuServe Data Technologies.

CompuServe
Data Technologies
1000 Massachusetts Avenue
Cambridge, MA 02138

1-800-USE-1032 Ext. 500
8-6 P.M. EST

Think Big. Think Fast.
Think System 1032.

NEW PRODUCTS — SYSTEMS

Data storage

Digital Equipment Corp. has announced removable disk-drive products.

The Removable Storage Element (RSE) is reportedly based on DEC's DSSI architecture, which encloses the disk drive and controller in a single 5¼-in. package called an Integrated Storage Element. Several security features are included, such as a key lock and thermal protection sensors, DEC said.

Able to provide 150M bytes of storage and usable for DEC Q-bus Microvax systems, the individual RF30 RSEs are priced at $5,600; dual packages range from $14,000 to $15,500. A larger RF71 RSE, supplying 400M bytes of storage, is also available.

DEC
111 Powdermill Rd.
Maynard, Mass. 01754
508-493-5111

DSP Systems Corp. has announced a 20-MHz multimode memory board reportedly intended for high-speed digital signal-processing applications.

According to DSP, the DMEM-512 contains static memory that appears to the Motorola, Inc. VMEbus as 512K words of linearly addressed 16-bit-wide memory space. The board is said to be capable of operating as a frame store, acquiring data from either of two 16-bit input ports, or as a continuously running variable-length delay line. It also can repeatedly, or in a single shot, send a stored pattern to its output port, the vendor said.

The price is $7,500 in small quantities.

DSP Systems
1061 N. Shepard St., Unit-C
Anaheim, Calif. 92806
714-630-1330

General Business Technology, Inc. has announced a streaming-tape drive that features a 150M-byte ¼-in. tape cartridge compatible with IBM System/36 models.

The GBT 4357 features unattended operation using a system timer and proprietary, menu-driven software. According to the company, standard IBM procedures are used for attaching and backup. The drive is compatible with the 60M-byte IBM 6157 streaming-tape drive, and it insures data integrity through the use of read-after-write procedures with automatic error correction.

Available now, the drive sells for $1,995 and is backed by a one-year replacement warranty.

General Business Technology
1891 McGaw Avenue
Irvine, Calif. 92714
714-261-1891

I/O devices

Versatec, a unit of Xerox Corp.'s Engineering Systems Division, has announced a graphics processor for its electrostatic color plotters.

The Model 880 processor was reportedly designed to combine with Pinebush Technologies, Inc. IC Plot software, a plotting utility and a proprietary plotter to provide self-contained plotting for very large-scale integration (VLSI) circuits.

According to Versatec, the processor contains custom VLSI graphics chips, can separate up to 4,000 shades of color and can connect to Sun Microsystems, Inc. and Digital Equipment Corp. VAX platforms.

With additional memory options available, the controller is priced at $24,750.

Versatec
2710 Walsh Ave.
Santa Clara, Calif. 95051
408-988-2800

Human Designed Systems (HDS) has introduced a line of display devices designed to run X Window System-based applications.

The HDS Viewstation modular family reportedly implements the X11 windowing standard to support monochrome and color displays, which are available in a variety of screen sizes and resolutions, the vendor said.

All units are said to be built around a 10-MHz Intel Corp. 80186 processor and a TI 34010 controller for graphics.

The display devices also have two standard serial ports that support communications at speeds up to 57.6K bit/sec.

Prices range from $1,999 to $6,999, depending on configuration.

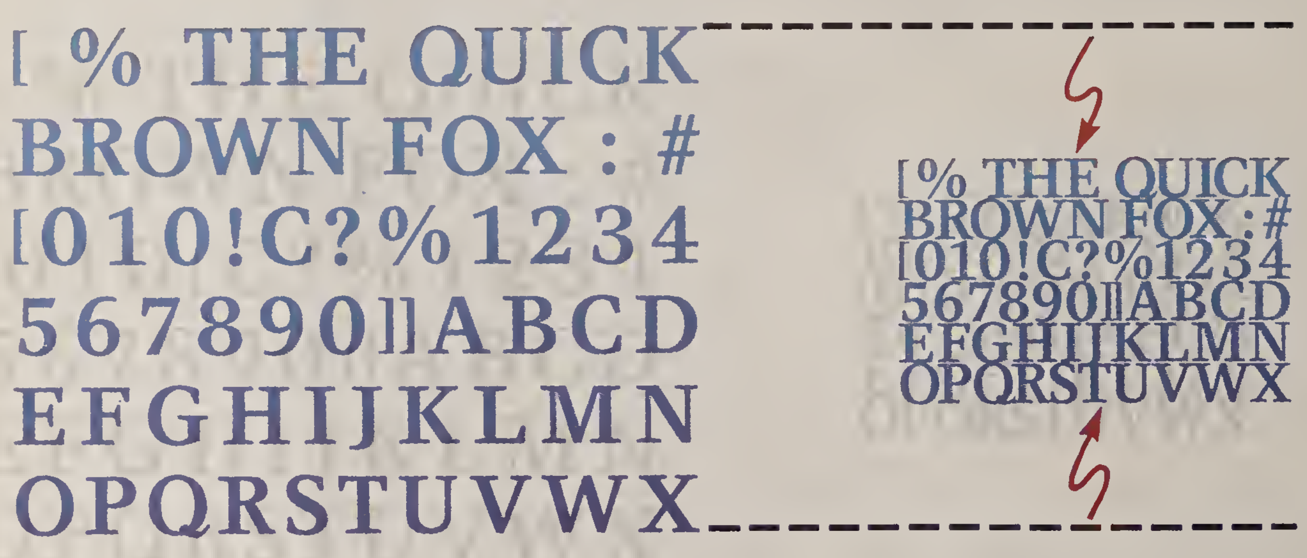
HDS
3440 Market St.
Philadelphia, Pa. 19104
215-382-5000

Five dot matrix printers have been added to AEG Olympia International's product line.

The additions reportedly include three 24- and two nine-pin printers. The 24-pin printers offer draft-quality print ranging from 200 to 240 char./sec. or letter-quality with either 67 or 80 char./sec. Prices range from $599 for the most basic model to $1,049 for a wide-carriage color version.

The nine-pin models include the NP 80SE — a 300 char./sec draft, 60 char./sec. near-letter-quality printer listed at $499 — and the NP 136SE, a wide-carriage 136-col. printer priced at $699.

AEG Olympia
Box 22
Somerville, NJ 08876
201-231-8434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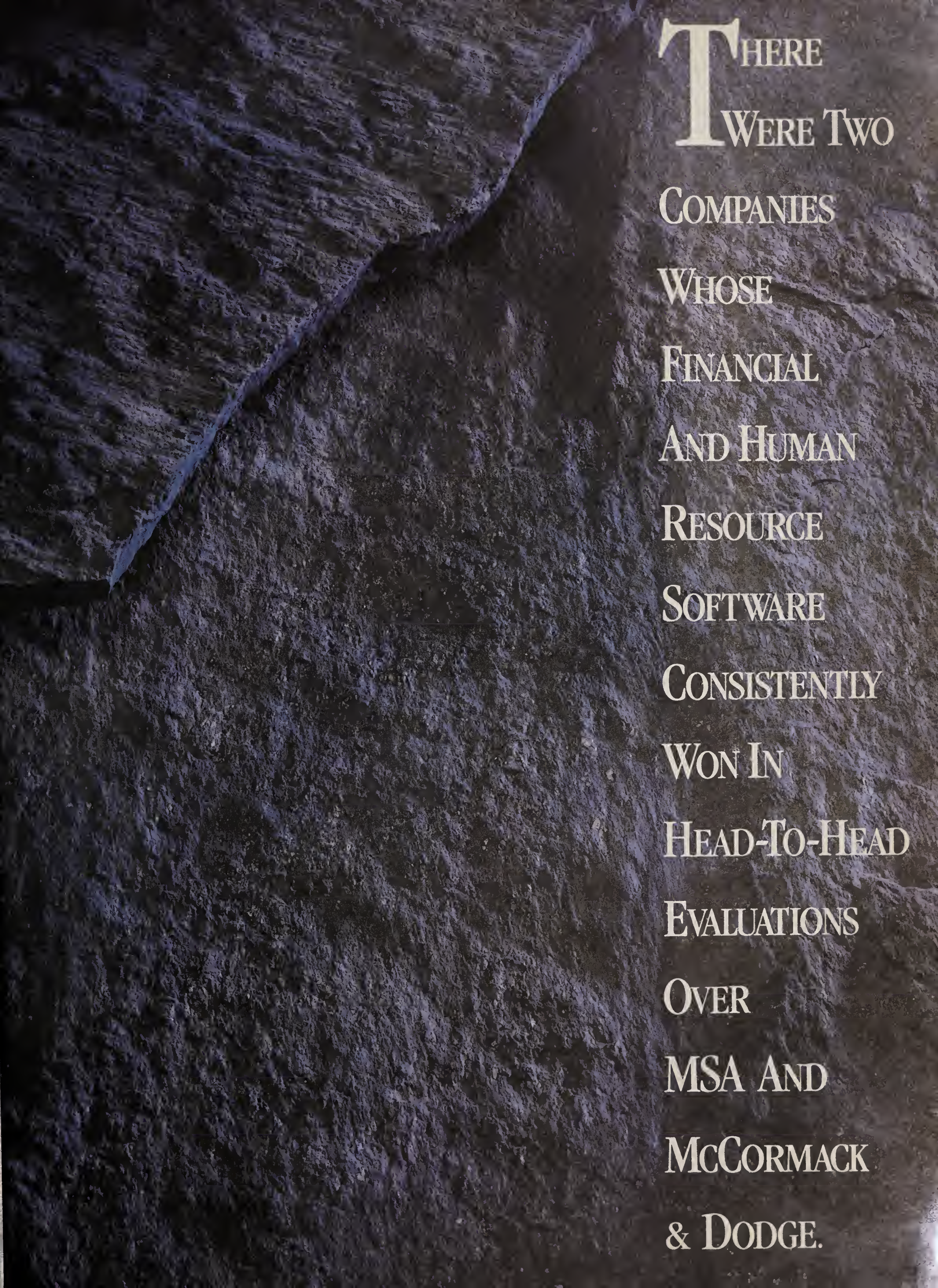
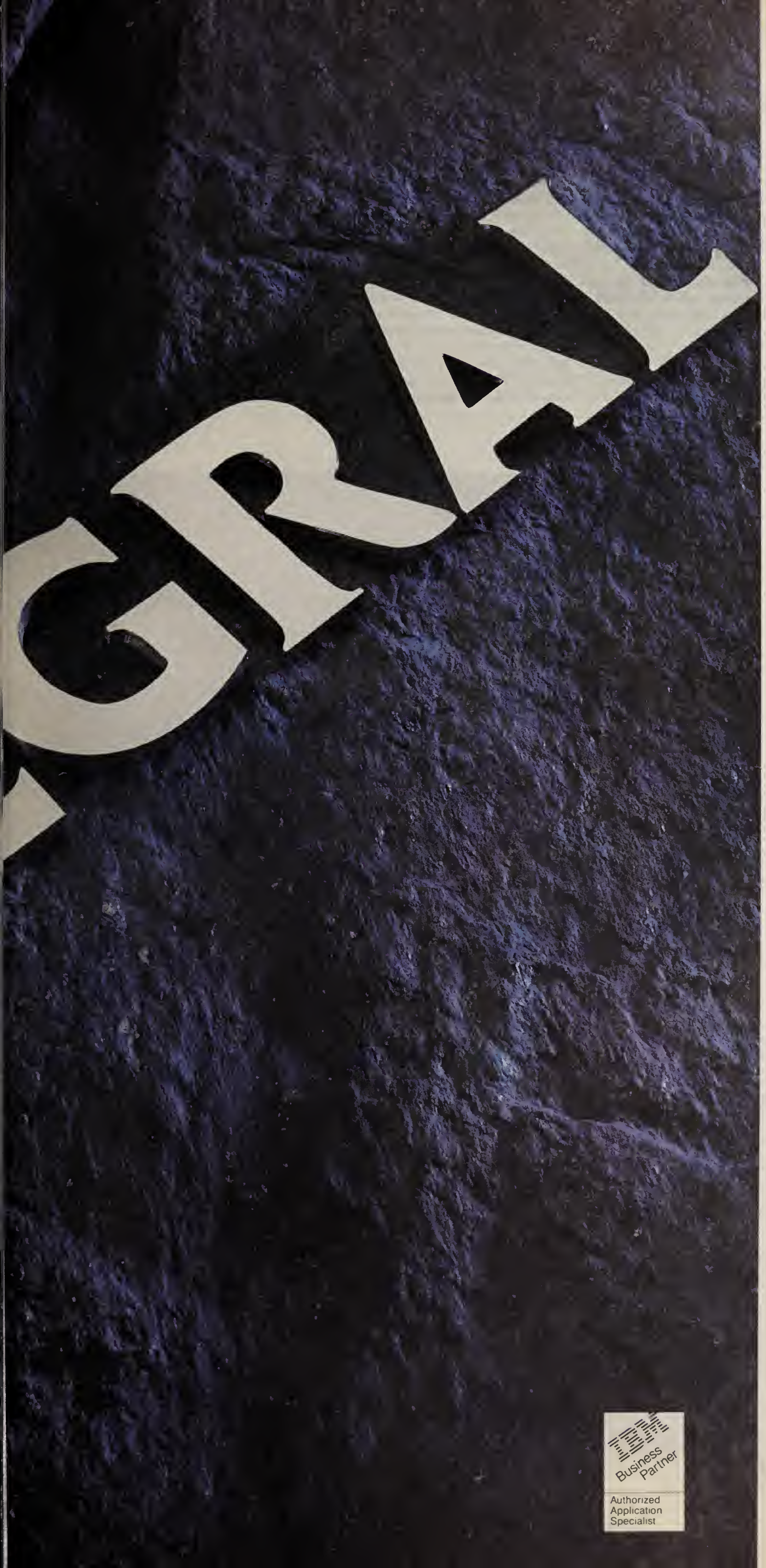


There Were Two Companies Whose Financial And Human Resource Software Consistently Won In Head-To-Head Evaluations Over MSA And McCormack & Dodge.

INTE



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NEW PRODUCTS — SOFTWARE

Development tools

Inference Corp. has announced an application development tool aimed at the IBM mainframe marketplace.

Version 1.5 of ART-IM/MVS permits developers to embed expert systems applications within traditional applications software residing in the IBM MVS operating system using TSO, IMS and CICS teleprocessing monitors, the company said. Written in C, ART-IM provides a hybrid rule and object representation language. It can directly access IBM's DB2 and a variety of third-party databases.

The first-copy price is $100,000 for development and $60,000 for runtime. Quantity discounts are available.

Inference
5300 W. Century Blvd.
Los Angeles, Calif. 90045
213-417-7997

Adpac Corp. has upgraded its software productivity tool kit used for the maintenance and enhancement of existing systems, data administration and reverse engineering of new systems on IBM MVS-compatible mainframes.

Release C3.02 of PM/SS reportedly analyzes the impact of implementing systemwide changes; analyzes and documents Cobol, PL/1 and ALC programs; and can help establish and enforce programming and data-naming standards.

The system includes three options: a CICS interface; Design, an option that correlates business and applications elements and performs logical subject-matter database design; and an IMS/IDMS interface for IMS database systems and Computer Associates International, Inc.'s IDMS IDD data dictionary.

A first-year license for either the Cobol or PL/1 ALC version costs $75,000 or $112,500 for both. A first-year license fee for each option is $15,000.

Adpac
340 Brannan St.
San Francisco, Calif. 94107
415-974-6699

XDB Systems, Inc. has announced SQL support for its software that enables personal computers to be used as a development platform for IBM mainframe DB2 applications.

Version 2.30 of XBD DB2 Workbench reportedly allows the user to select the SQL compatibility mode from multiple standards, can optionally support IBM's mainframe EBCDIC character set instead of ASCII, has a user-definable Sort sequence and can time-stamp data when inserted into a database. Compatible with DB2 Version 2.1, the Workbench for MS-DOS, including the SQL engine, costs $1,500. Other versions, including one used as a server on an IBM Netbios local-area network, are available.

XDB Systems
Suite 220
7309 Baltimore Ave.
College Park, Md. 20740
301-779-6030

Applications packages

Stellar Computer, Inc. has upgraded the visualization capabilities of its software for the scientific and engineering environments.

Features of the Application Visualization System Release 2 reportedly include the capability of visualizing geometric, image and volume data sets; a network editor; an application builder; and support for direct, real-time coupling of user computational programs into the visualization process.

The program is bundled with Stellar graphics supercomputers at no charge. Existing customers will receive free upgrades, the company said.

Stellar Computer
85 Wells Ave.
Newton, Mass. 02159
617-964-1000

Applied Dynamics International (ADI) has reportedly upgraded its simulation language to include a range of vector and matrix operations that simplify mathematical modeling.

Called Adsim Version 7.0, the simulation language is said to help engineering and scientific users of the ADI System 100 to group variables together for simplified input and output to external hardware devices for graphical display or for data logging.

Automatically included as part of the ADI System 100 dynamic-simulation computer system, a typical configuration costs approximately $350,000 to $450,000, the company said. Existing System 100 users can upgrade by purchasing software maintenance contracts. An adaptation for Digital Equipment Corp.'s VAX systems is also available.

ADI
3800 Stone School Road
Ann Arbor, Mich. 48108-2499
313-973-1300

SAS Institute, Inc. has enhanced Neovisuals, its three-dimensional graphics and animation software package.

Release 4.5 features a computer graphics metafile conversion that allows the translation of graphics information to Neovisuals from any data or two-dimensional system, the vendor said. The software runs on several platforms, including Digital Equipment Corp. VAX/VMS systems, Hewlett-Packard Co.'s 9000 series 350 SRX (turbo) and Sun Microsystems,

DCA is a registered trademark and IRMA 3 Convertible is a trademark of Digital Communications Associates, Inc. Reprinted from

Inc.'s 3/260 series.

The first-year license fee for the Neovisuals base component ranges from $750 to $13,800.

SAS Institute
P.O. Box 8000
SAS Circle
Cary, N.C. 27511
919-467-8000

Training

The Siggraph Association for Computing Machinery, Inc. has introduced a 60-minute videotape that reviews state-of-the-art computer graphics hardware and software technologies, the company said.

According to Siggraph, the Visualization/State of the Art:Update video was produced by Pacific Interface, Inc., an international graphics consulting firm, and includes interviews with 14 computer graphics experts regarding current market developments and future trends. The tape is available to Siggraph members for $95 and nonmembers for $195 in VHS format.

Siggraph
ACM Order Dept.
P.O. Box 64145
Baltimore, Md. 21264
800-342-6626

McCormack & Dodge Corp. has announced four computer-based training (CBT) products developed for selected Millennium financial software systems.

The CBT products include AR:M Cash Application, GL:M Journal Processing, AP:M Voucher Entry, and Fundamentals of Millennium. Users may train at their terminals or at personal computers with simulated M&D systems, the company said. The programs are available in versions for both IBM PCs and mainframes, and site licenses range from $7,600 to $19,400.

McCormack & Dodge
1225 Worcester Road
Natick, Mass. 01760
508-655-8200

Utilities

Alphatronix, Inc. has announced a backup utility software package for Digital Equipment Corp. workstation users.

Rapidstore is for use with the company's Inspire series of erasable optical-storage systems. Used in conjunction with each other, the products provide software backup operations five times faster than tape, the vendor said. DEC's VMS 4.4 through 5.0 is required for operation. The software costs $1,900 for a DEC Q-bus configuration and $2,900 for a Unibus version.

Alphatronix
Suite 1000
4900 Prospectus Drive
Research Triangle Park, N.C. 27709
919-544-0001

REM Associates has announced the release of an IBM Application System/400 version of Remdoc, the company's automated documentation package.

The latest release was developed for users who have migrated to the AS/400 while maintaining applications in the IBM System/36 environment.

The upgrade is priced from $100 to $500, depending on how long the customer has owned Remdoc, with new users eligible for the lowest amount, according to the company.

REM Associates
P.O. Box 527
Village Station
New York, N.Y. 10014
212-243-2416

Computer-aided software engineering

Pansophic Systems, Inc. has announced an OS/2-based computer-aided software engineering product designed for Pansophic Telon users.

Telon/Teamwork 1.0 reportedly allows users to perform structured analysis and design of applications by utilizing IBM's Programmable Workstation Software development platform and Cadre Technologies, Inc.'s multitasking/virtual memory environment.

The product incorporates cooperative processing architecture and allows data modeling and data flow diagrams to be used for application development. The software is priced at $6,500 per copy for quantities of two or more.

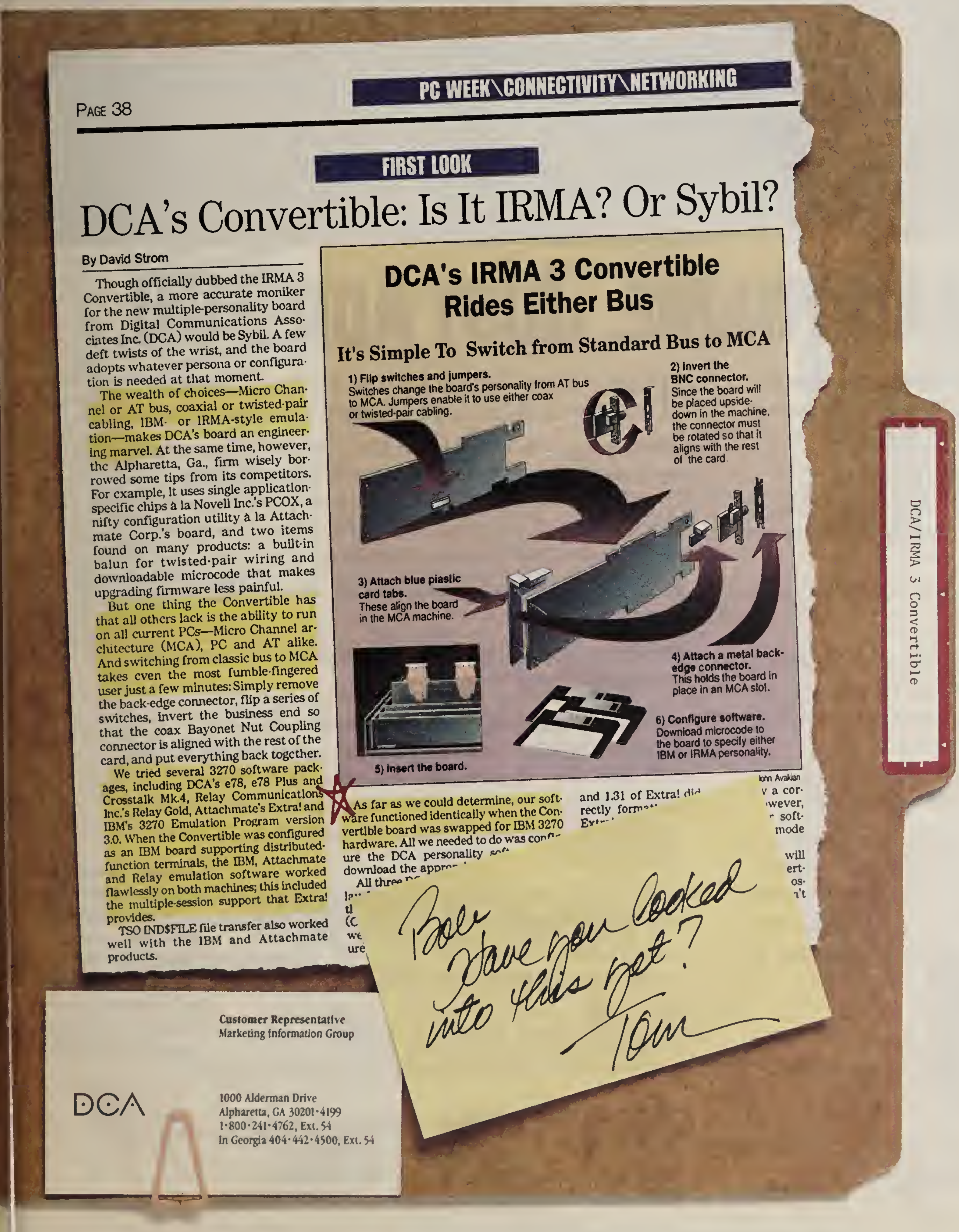
Pansophic Systems
2400 Cabot Drive
Lisle, Ill. 60532
312-505-6000

A computer-aided software engineering development tool for multiuser personal computer-based systems has been announced by International Consulting Enterprises, Inc.

Release 2.0 of Applaud reportedly allows PC users to create applications systems without writing programming code. The computer must be running MS- or PC-DOS and have a minimum of 640K bytes of memory, with 485K bytes available for Applaud, the company said. The software includes self-documentation capabilities that analyze the design specifications to produce customized end-user manuals. Networks compatible with Novell, Inc.'s Betrieve/N are supported.

Normally priced at $2,495, the product will be discounted to $1,995 through October.

International Consulting Enterprises
10 S. Riverside Plaza
Chicago, Ill. 60606
800-426-0428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PC WEEK\CONNECTIVITY\NETWORKING

FIRST LOOK

DCA's Convertible: Is It IRMA? Or Sybil?

By David Strom

Though officially dubbed the IRMA 3 Convertible, a more accurate moniker for the new multiple-personality board from Digital Communications Associates Inc. (DCA) would be Sybil. A few deft twists of the wrist, and the board adopts whatever persona or configuration is needed at that moment.

The wealth of choices—Micro Channel or AT bus, coaxial or twisted-pair cabling, IBM- or IRMA-style emulation—makes DCA's board an engineering marvel. At the same time, however, the Alpharetta, Ga., firm wisely borrowed some tips from its competitors. For example, it uses single application-specific chips à la Novell Inc.'s PCOX, a nifty configuration utility à la Attachmate Corp.'s board, and two items found on many products: a built-in balun for twisted-pair wiring and downloadable microcode that makes upgrading firmware less painful.

But one thing the Convertible has that all others lack is the ability to run on all current PCs—Micro Channel architecture (MCA), PC and AT alike. And switching from classic bus to MCA takes even the most fumble-fingered user just a few minutes: Simply remove the back-edge connector, flip a series of switches, invert the business end so that the coax Bayonet Nut Coupling connector is aligned with the rest of the card, and put everything back together.

We tried several 3270 software packages, including DCA's e78, e78 Plus and Crosstalk Mk.4, Relay Communications Inc.'s Relay Gold, Attachmate's Extra! and IBM's 3270 Emulation Program version 3.0. When the Convertible was configured as an IBM board supporting distributed-function terminals, the IBM, Attachmate and Relay emulation software worked flawlessly on both machines; this included the multiple-session support that Extra! provides.

TSO IND$FILE file transfer also worked well with the IBM and Attachmate products.

DCA's IRMA 3 Convertible Rides Either Bus

It's Simple To Switch from Standard Bus to MCA

1) Flip switches and jumpers. Switches change the board's personality from AT bus to MCA. Jumpers enable it to use either coax or twisted-pair cabling.

2) Invert the BNC connector. Since the board will be placed upside-down in the machine, the connector must be rotated so that it aligns with the rest of the card.

3) Attach blue plastic card tabs. These align the board in the MCA machine.

4) Attach a metal back-edge connector. This holds the board in place in an MCA slot.

5) Insert the board.

6) Configure software. Download microcode to the board to specify either IBM or IRMA personality.

John Avakian

As far as we could determine, our software functioned identically when the Convertible board was swapped for IBM 3270 hardware. All we needed to do was con

Bob
Have you looked
into this yet?
Tom

Customer Representative
Marketing Information Group

DCA

1000 Alderman Drive
Alpharetta, GA 30201-4199
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   - 30. Medicine/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50 Business Service (except DP)
   - 60. Government — State/Federal/Local
   - 65. Communications Systems/Public Utilities/Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric
   - 80 Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   - 90. Computer/Peripheral Dealer/Distributor/Retailer
   - 75. User Other ______
   - 95 Vendor Other ______ (Please specify)

2. **TITLE/FUNCTION** (Circle one)
   IS/MIS/DP MANAGEMENT
   - 19. Vice President Asst VP
   - 21. Dir Mgr Suprv IS/MIS/DP Services
   - 22. Dir Mgr Suprv of Operations Planning Adm Services
   - 23. Dir Mgr Suprv Analyst of Systems
   - 31. Dir Mgr Suprv of Programming
   - 32. Programmer Methods Analyst
   - 35. Dir. Mgr Suprv OA/WP
   - 38 Data Comm Network/Systems Mgt

   OTHER COMPANY MANAGEMENT
   - 11. President Owner/Partner General Mgr
   - 12 Vice President/Asst VP
   - 13 Treasurer Controller Financial Officer
   - 41. Engineering Scientific, R&D Tech Mgt
   - 51. Sales/Mktg Mgt

   OTHER PROFESSIONALS
   - 60. Consulting Mgt
   - 70. Medical, Legal Accounting Mgt
   - 80. Educators Journalists Librarians, Students
   - 90. Others ______ (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor or consultant
   - A. Mainframes/Superminis
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
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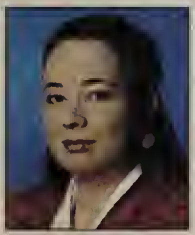


It's one thing to grab mainframe power and dump it down onto the desktop. Actually, it's a rather nice and much-needed concept. But it's another thing entirely to pile the related hardware and software requirements squarely on the backs of unsuspecting users and their budgets.

This is not what users want, but it is what seems to be going on today, what with the push toward faster, more expensive platforms, ever spiraling memory requirements and all kinds of attendant issues. And this at a time when many information systems departments are questioning the validity of separate information centers.

Behind the software developers touting applications that require at least 2M bytes of memory beyond the 4M bytes already sucked up by OS/2 and the still 2M bytes more required by Presentation Manager (and don't even think of loading a second application), you've got three heavyweights — IBM, Intel and Microsoft — insisting that users *need* a 386, or at least a 386SX.

Don't forget, 486-based

Continued on page 49

It's the flu season for micros

Expected autumn virus strains breed apprehension among PC users

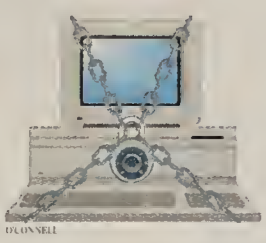
BY MICHAEL ALEXANDER
CW STAFF

Along with the assorted colds and flus that usually come in the fall and winter seasons, end users are apt to find themselves warding off personal computer viruses this year.

The Cascade, Datacrime and at a least a few strains of Jerusalem viruses (among others) will hit PCs starting in October and continue nearly unabated until December, according to computer security experts.

Not surprisingly, the many publicized instances of computer viruses and other sorts of electronic mayhem occurring in recent years have corporate and government computer users more worried than ever before.

"The Internet virus had a good side, in that it heightened the world's attention to what could happen without adequate computer security," said Eliot Sohmer, chief of the office of standards and commercial product evaluations at the National Computer Security Center, a division of the National Security Agency. "We have had corporate executives calling like crazy for information and advice."



As a result of episodes such as the Internet attack, sales of computer security devices and software topped $588 million last year and will double by 1992, according to market researchers at Frost & Sullivan, Inc.

"We heard there was some type of virus in MS-DOS that was due to trigger on Columbus Day, and we are concerned about it," said Don Kessler, internal computer consultant at Perrin Fordree and Co. in Troy, Mich.

The accounting company is in the midst of formulating a PC security program that includes evaluating a variety of security options, ranging from call-back modems to cryptographic-based technology that uses algorithms to scramble and unscramble data, thereby restricting access to a PC. "It's a reactive issue to the reports in the media," Kessler admitted.

Among the options under

Continued on page 49

Inside

- Toshiba laptop, others in review. Page 41.
- Survey says commercial workstation move may not be easy. Page 45.
- New Wave combines best of DOS, Apple. Page 48.

U.S. Trust seeks speed with optical system

ON SITE

BY RICHARD PASTORE
CW STAFF

NEW YORK — Hoping to eradicate paper pandemonium and provide more prompt financial service to its clients, United States Trust Co. has put its faith in a networked optical document storage and retrieval system.

"We are systematically going through [the trust department's] 10,000 files, coding the documents and scanning them into the optical disc system for retrieval purposes," said Stuart Aisenbrey, senior vice-president and manager of trust administration at the 136-year-old trust institution.

The Discus 2001 system from New York-based Advanced Graphic Applications, Inc. (AGA) replaces U.S. Trust's paper filing system, which necessitated physical storage, hand filing and delivery of paper files to account officers.

With the new system, account managers can instantly recall client files from optical disc in order to review letters, wills, certificates and various other documents that include text, graphics and signatures.

U.S. Trust's Aisenbrey *shepherds switch to optical system*

The system currently consists of four optical scanning stations for information input and five IBM Personal Computer AT and Intel Corp. 80386-based Personal System/2 machines configured as document retrieval stations.

The machines access an optical disc jukebox containing 75

Continued on page 46

Presentation Manager Arrives For Micro Focus COBOL/2 Programmers!

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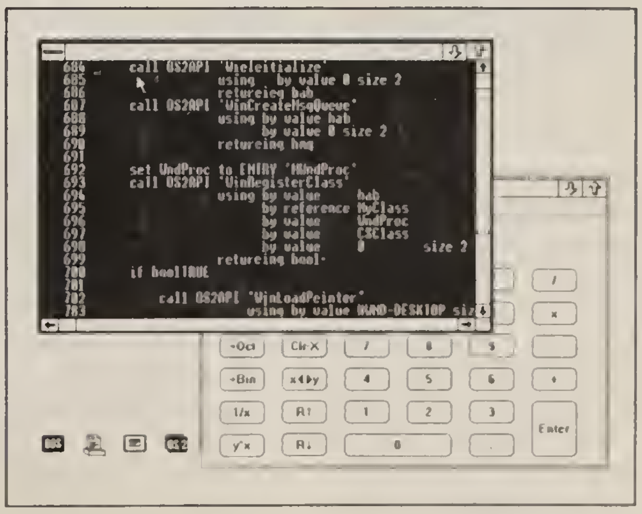

```
call OS2API 'WinInitialize'
            using   by value 0 size 2
            returning hab
call OS2API 'WinCreateMsgQueue'
            using by value hab
                  by value 0 size 2
            returning hmq

set WndProc to ENTRY 'MWndProc'
call OS2API 'WinRegisterClass'
            using by value     hab
                  by reference MyClass
                  by value     WndProc
                  by value     CSClass
                  by value     0          size 2
            returning bool
if boolTRUE

    call OS2API 'WinLoadPointer'
                using by value HWND-DESKTOP siz
```

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PRODUCT REVIEWS

Toshiba T5200: A speedy laptop

Features high-quality display resolution and expandability

The Toshiba T5200 is unparalleled among laptop and portable computers when it comes to speed, display resolution and expandability.

Toshiba's T5200 *has a gas-plasma display and complete keyboard*

The gas-plasma display is particularly readable, although it does not provide flexibility in control of color emulation. The solid gray case includes a fold-out handle and measures 14.6 in. wide, 15.6 in. deep and 3.9 in. thick. The keyboard is one of the most complete on any laptop and includes a separate numeric keypad. The only major drawback is its weight — nearly 20 pounds.

The T5200 includes an Intel Corp. 80386 processor that runs at 20 MHz, 2M bytes of 32-bit random-access memory, two serial ports, a Video Graphics Array (VGA)-compatible red-green-blue port, a socket for an Intel 80387 numeric coprocessor and a combination parallel port/external disk-drive port which supports an external 5-in., 360K-byte floppy disk drive. Memory may be expanded to a total of 8M bytes. All memory above 640K can be configured as extended or as Lotus/Intel/Microsoft Expanded Memory Specification in 500K-byte increments; 96K bytes can be reserved to hold a copy of read-only memory. Additionally, 32K bytes of high-speed cache memory is included.

Two standard IBM Personal Computer expansion slots are provided — one for full-length 8- or 16-bit cards, one for half-length 8-bit cards. A proprietary Toshiba expansion slot is available as well, although there is not enough room to use the Toshiba slot and the half-length XT slot simultaneously. No connection is provided for an external keyboard or keypad.

Toshiba T5200
Price: $7,699
• Performance: Very good to excellent • Documentation: Excellent • Setup: Very good • Ease of use: Good • Serviceability: Very good • Support: Very good to excellent • Value: Good

Storage includes a 1.4M-byte, 3-in. disk drive and a 40M-byte hard disk. A 100M-byte hard disk version is also available.

The built-in 9- by- 6.7-in. gas-plasma display supports high-resolution VGA graphics and operates in IBM's Enhanced Graphics Adapter (EGA) and Color Graphics Adapter (CGA) modes as well. The same display driver can drive an external VGA monitor.

The T5200 comes with MS-DOS Version 3.3, utilities designed for setting the system configuration and display modes, Quarterdeck Office Systems, Inc.'s QEMM-386 expanded memory manager and Multisoft's PC-Kwik Power Pak.

Security-related features include the ability to lock the cover in place with a built-in combination lock and a slide-out bracket that allows the machine to be locked in place. Unfortunately, the power switch remains exposed.

The Toshiba T5200 is fast. It ran all the test software flawlessly while switching among CGA, EGA and VGA modes. The display has a completely dark background, providing excellent contrast. One drawback is that Toshiba does not provide battery power for the T5200.

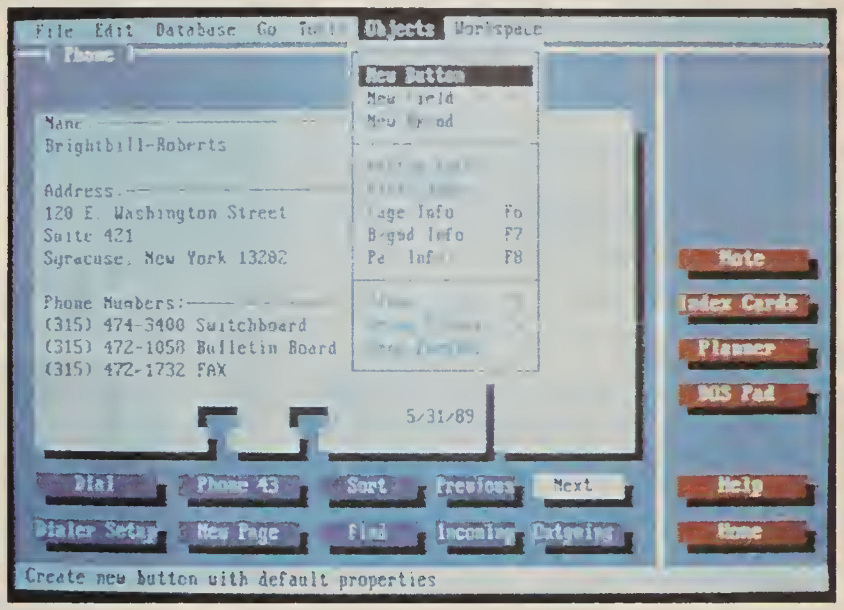
The T5200's documentation consists of three manuals and a First Time setup kit. The setup kit includes an MS-DOS quick-reference card, a warranty and service information, MS-DOS disks, an on-line Help disk and the First Time setup booklet.

The setup operation is clearly documented. Adding expansion cards takes about the same

Continued on page 43

Brightbill-Roberts' Hyperpad for hypertext

Hyperpad, from Brightbill-Roberts, is a character-based operating environment that runs on top of MS-DOS. It provides DOS users with tools for developing applications and presenting information with hypertext links, much like Hypercard, the object-oriented operating environment for Apple Computer, Inc. Macintosh users.



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5/31/89

Create new button with default properties

Hyperpad uses *Padtalk, a compiled programming language*

The Padtalk programming language is similar in structure and syntax to Hypercard's Hypertalk, but Padtalk is compiled. Padtalk also has some resemblance to Pascal; for example, it uses begin/end constructs. Padtalk also uses variables to hold values. These are typeless; they need not be declared and can accommodate either text or numeric values. The language does not support arrays.

Hyperpad's objects include applications written in Padtalk, called pads, that are made up of pages and saved in separate files. Each pad has one or more background screens that can show through to the pages.

The size of a pad is limited only by disk storage. Only one pad can be active at a time, but pads can be linked in hypertext fashion.

Other objects, which can be placed on pages or backgrounds, are buttons and fields. Hyperpad's buttons are like triggers and usually initiate some action when "pressed." Its fields can store text or serve as a means to get user input. Fields can be scrollable.

A collection of fields can act as a database when the field names are stored on a background page and each record is kept on a separate page. Hyperpad has commands to search, sort and query

Continued on page 42

Reflex upgraded, but not enough

Borland International's Reflex 2.0 is a graphics-based flat-file data analysis program. Unlike its predecessor Reflex 1.1, the new version does not load all its data into memory. It can handle up to 65,000 records or 32M bytes, whichever comes first.

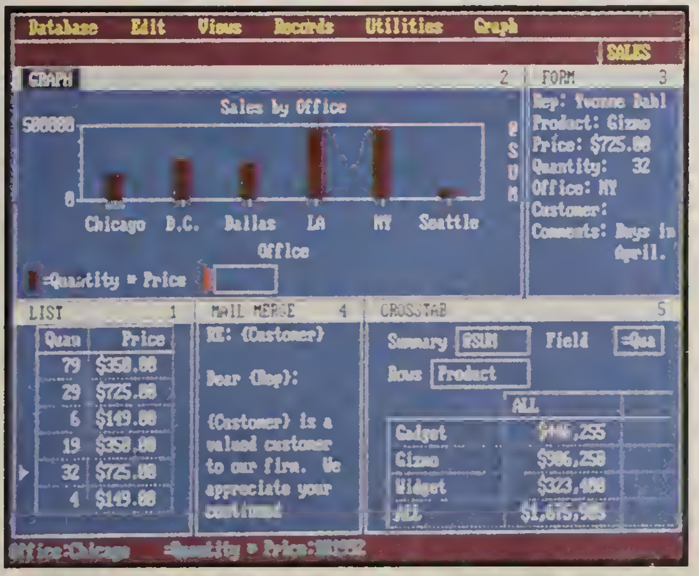
Unfortunately, many necessary enhancements have not been made. Indexing has not been added to the product's data handling to compensate for the disk-access slowdown, and it still does not offer macro capability.

New features include graphics and form-design capabilities, ideal for designing custom data-entry screens.

A query filter can now be applied to a cross tab, and the capability of using formulas in each view has been expanded. Mail-merge is possible, and a crude text editor is also included.

According to Borland, Reflex maintains speed through an object-oriented design called virtual real-time object-oriented memory manager. VROOMM structures the program into small objects that are loaded into memory only as needed. However, the VROOMM design and another intended speed booster, asynchronous disk input/output, do not seem to produce the desired effects.

Reflex offers many data types, including text fields, numeric, integer, date and calculated fields. Although clearly a database-oriented product, it has some spreadsheet-like features. In fact, its functions and operating characteristics are similar to Lotus Development Corp.'s 1-2-3 spreadsheet.



Rep: Yvonne Dahl
Product: Gizmo
Price: $725.00
Quantity: 32
Office: NY
Customer:
Comments: Buys in April.

Quan	Price
79	$350.00
29	$725.00
6	$149.00
19	$350.00
32	$725.00
4	$149.00

RE: {Customer}

Dear {Rep}:

{Customer} is a valued customer to our firm. We appreciate your continued

	ALL
Gadget	$446,255
Gizmo	$906,250
Widget	$323,400
ALL	$1,675,905

Office:Chicago =Quantity * Price:[illegible]

Borland's Reflex 2.0 *maintains speed through VROOMM, an object-oriented design*

One example of the spreadsheet-like approach to data handling is the way in which Reflex treats calculated fields. Users can type in a "local" value over a formula. This overrides any formula already entered for that field. Reflex can also calculate a value and treat the result as a local value that overrides the formula. A calculated field can be protected from having any local value replacing it.

Reflex Version 2.0
Price: $249.95
• Performance: Satisfactory to very good • Documentation: Excellent • Ease of learning: Very good • Ease of use: Very good • Error handling: Poor • Support: Very good • Value: Very good

Data-entry forms and data tables can be created and customized. They can be viewed individually or placed on the screen simultaneously. Reflex offers quick columnar reports as well as quick form-based reports. Reports can be previewed before they are sent to the printer.

Reflex takes data only from the current data file; it has no

Continued on page 42

Hyperpad

CONTINUED FROM PAGE 41

such databases. Data can be imported from Ashton-Tate Corp. Dbase files and ASCII files.

Padtalk scripts consist of procedures called "handlers" that respond to messages sent through the system. When an object receives a message for which it has a handler, it takes the actions specified in the script, which may include sending out other messages.

Hyperpad comes with about two dozen pads, provided both as useful tools and examples of what can be done with Hypertalk. Sample pads include desktop utilities and system utilities. The scripts for the supplied pads can be customized.

The package also includes a temporary stay-resident screen-capture program for saving screens to a file, which can then be imported into a pad. This feature makes Hyperpad a suitable environment for creating interactive product demos, prototypes or training programs.

Hyperpad

Price: $99.95

- Performance: Good
- Documentation: Poor
- Ease of learning: Satisfactory
- Ease of use: Good
- Error handling: Satisfactory
- Support: Satisfactory to very good
- Value: Very good

Despite the lack of graphics, Hyperpad is capable of producing attractive screens and interfaces and can be programmed to do simple animation. Hyperpad also generates sounds and plays simple tunes.

Hyperpad's documentation consists of a paperback user's guide, a booklet to help users get started and a quick-reference card. The manual is easy to read but is incomplete; for instance, there is no mention of error messages.

A pad called Tutorial functions as an interactive, on-line tutorial. Nonprogrammers will probably be bewildered by some of Padtalk's more complex scripts, and at times the user interface can be confusing because of the numerous shortcut keys, function keys and pull-down menu options available. Having a mouse will make things much easier.

Hyperpad saves pads automatically and also has a command called Save a Copy that makes a backup. The main menu has an Undo command, but it cannot restore an accidentally deleted button. Individual pads are assigned one of five levels of protection, ranging from browsing mode, which does not allow changes, to scripting mode, which provides full access.

Free — but not toll-free — phone support is available from 9:00 a.m. to 6:00 p.m. Eastern time. Brightbill-Roberts also maintains a bulletin board for users. Support technicians responded knowledgeably.

Hyperpad's current implementation has a few rough spots, and its overall usefulness remains up in the air, but with a retail price of $99.95, it is a clever idea priced for the masses. Its ultimate success depends in large part on the existence of third-party pads. None are available yet.

Reflex

CONTINUED FROM PAGE 41

multifile lookup functions. It does offer a few functions that allow lookup of data from the previous record, first record in a group or last record in a group when printing a report.

To perform a query in Reflex, a user must bring up a list of data fields and enter the appropriate formulas in an adjacent column. "Or" conditions are placed in an additional series of columns, and "and" conditions are placed in the same column. The query can be applied to the database as a filter, which will affect all subsequent graph views, cross-tabs and reports. Reflex will automatically update the database, based on manipulations of the filtered data.

Reflex allows sorting of data for up to five fields simultaneously, with each field individually ordered in ascending or descending order. It automatically imports or exports Reflex, Version 1.1 files. Other file import and export types include Dbase, DIF, 1-2-3 Versions 1A and 2, Quattro, Paradox, Symphony, PFS and ASCII.

The Reflex documentation offers excellent indexes and a short DOS tutorial. In place of an on-line tutorial there is a comprehensive tutorial manual.

Since Reflex is consistent in operation from view to view, it will be a one-step learning process for most people. 1-2-3 users will have it even easier.

However, there are some problems. Reflex is awkward to use with a mouse. Also, the asynchronous disk I/O feature can cause problems with data files when Reflex is run in anything but a strictly simple environment.

Borland provides unlimited free technical support, but the telephone line is not toll-free. There is also a 30-day money-back guarantee, fax and Compuserve support and extended support plans. Technical support is knowledgeable.

Although Reflex 2.0 is improved over Version 1.1, it is still lacking in many key areas. Despite its shortcomings, Reflex, priced at $249.95, can be one of the best analytical tools for users who have been trying to make Lotus 1-2-3 work like a flat-file database.

Tom bought Hewlett-Packard long

Spreadsheet duel for user loyalty heats up

BY PATRICIA KEEFE
CW STAFF

Users caught in the cross fire of the spreadsheet war waged by Microsoft Corp. and Lotus Development Corp. should find themselves peppered with considerable savings — if they haven't yet — from an ongoing battle of one-upmanship in promotional strategy.

Microsoft winds up a yearlong promotion on Excel for Windows later this month that it claims boosted Excel's market share from 10% to almost 15%.

Microsoft may be referring to total Excel sales — including the Apple Computer, Inc. Macintosh market — but figures from International Data Corp., a market research firm based in Framingham, Mass., put PC Excel sales closer to 9%. A Lotus spokeswoman also disputed Microsoft's figures, claiming Excel's market share today remains where it was in January — somewhere between 8% and 12%.

The promotion, which included an offer to trade Lotus' 1-2-3 for $75 or a free copy of either Microsoft Windows/286 or Windows/386, is part of a three-phased campaign to promote Excel sales over a six- to 18-month period.

The $75 rebate offer was particularly effective following delivery of 1-2-3 Release 3.0, claimed Phil Welt, group product manager of Microsoft's analysis business unit.

"We believe people were waiting for Release 3.0 to make a final decision [between Excel and 1-2-3]," Welt said, adding that "we definitely saw sell-through pick up after Lotus shipped 3.0." He also claimed that the number of Excel units moving through the reseller channels during the past year has increased 100%.

One noteworthy area of success has been the specific targeting of 12 large corporations, he said. Of that number, seven have installed more than 1,000 units of Excel, including Bank of America Corp. and several major aerospace and automotive manufacturers, according to Welt. Just last week, Microsoft signed a deal with the John E. Anderson Graduate School of Management at the University of California at Los Angeles, where Excel will replace Ashton-Tate Corp.'s Framework III as the recommended spreadsheet package.

Lotus went on the offensive for a time, offering a free upgrade from 1-2-3 Release 2.01 to Release 2.2 or 3.0 for users purchasing Release 2.01 between Sept. 6, 1988, and Aug. 31, 1989. "It worked very well; customers bought more 2.01 rather than Excel because of the free upgrade," a Lotus spokeswoman said.

A second Lotus promotion was launched in June. Purchasers of 1-2-3 Release 3.0 and Freelance 3.0 will get a $100 rebate through Dec. 31. Also, 3.0 will be priced at $495, the same as Release 2.2, until the end of the year, when 3.0's price will jump by $100.

Lotus most recently began shipping Freelance Plus 3.01, a reduced-memory version expected to particularly interest users who use memory-resident packages or are on networks.

Freelance Plus 3.01 requires 438K bytes of free memory after DOS is loaded, compared with the 508K bytes of memory required in previous versions. Memory requirements can be further reduced to 415K bytes, Lotus claimed. It costs $495; registered users of Freelance 3.0 can upgrade for $20.

Meanwhile, Microsoft has discontinued its $75 rebate, but distribution of free copies of Working Model, a functional but stripped-down version of Excel, will continue. Welt compared it to Apple's "Test-drive a Mac" program. Working Model programs cost about $7 each to make, and Welt said Microsoft has shipped 100,000 free copies so far at a cost of $700,000. "We think that for every 100 Working Model programs we ship, we sell about eight units of Excel," Welt said.

Other steps taken to increase awareness of Excel have included a nationwide free seminar program, a beefed-up advertising program and a greater investment in sales and support programs.

Toshiba

CONTINUED FROM PAGE 41

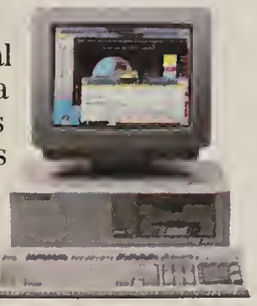
amount of time as with a desktop machine. Adding memory or a numeric coprocessor is relatively easy. Initial setup could be easier if the hard disk came prepared.

The speed, display, keyboard quality and flexibility of the T5200 make it a joy to use. The on-line help is top-notch, and it addresses hardware and software problems.

The T5200's case is sturdy, and all components are well shielded. Internal layout is clean. Although the display hinge is solid, its cover did not fit quite flush, and there was no cover for the connectors in back of the machine.

The T5200 comes with a one-year warranty that includes next-day turnaround on repairs. Technical support is available through a toll-free number.

The laptop lists for $7,699 with a 40M-byte hard disk and 2M bytes of RAM. It is in line with prices of other 386 portables but is considerably more expensive than 20-MHz 386-based desktops and 286-based laptop machines.



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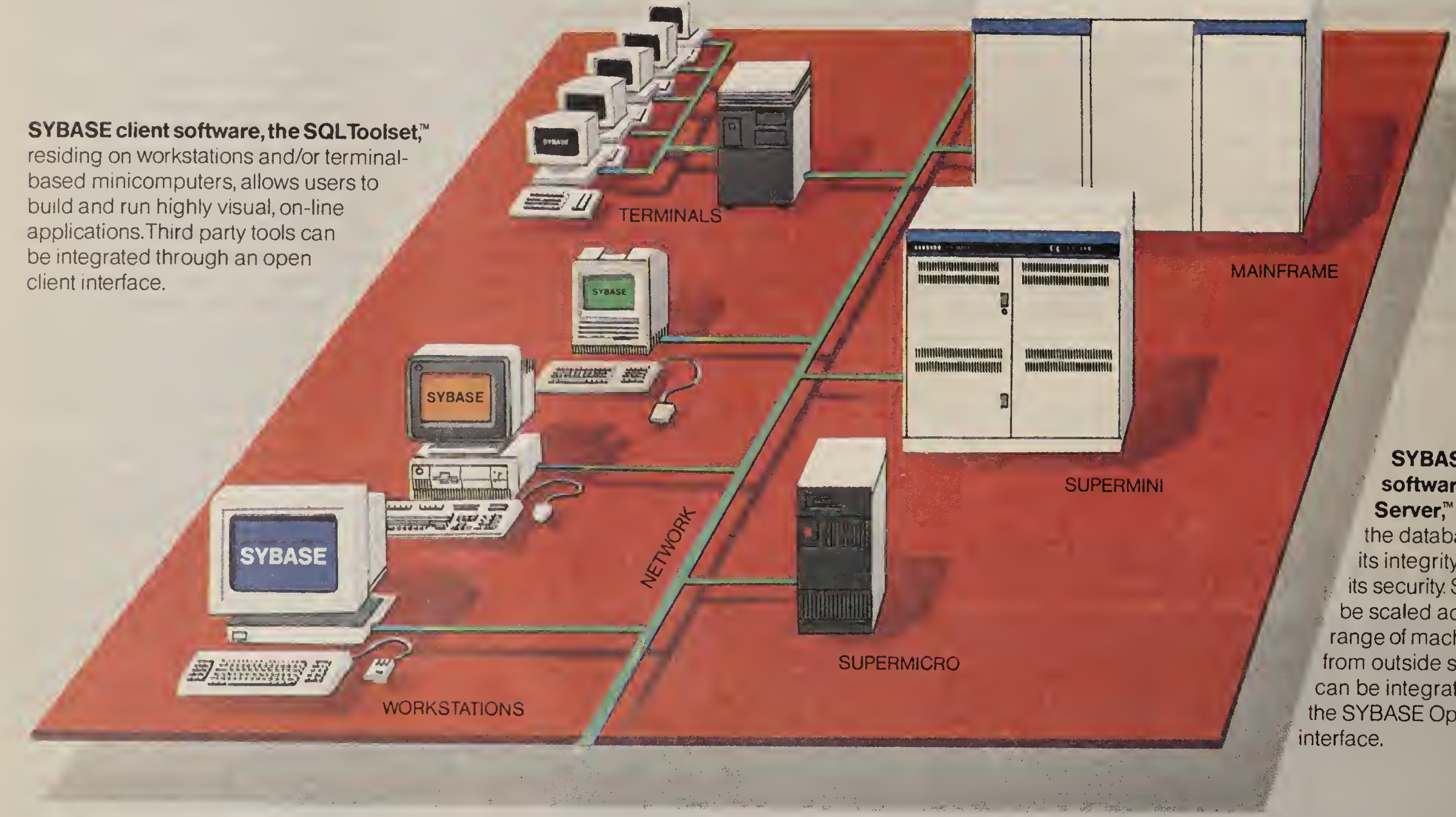

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#18	San Jose	10/10
#19	Hartford	10/11
#20	Toronto	10/11
#21	Pittsburgh	10/19
#22	New York City	10/24
#23	St. Louis, MO	10/24
#24	Milwaukee	10/26
NOVEMBER		
#25	San Francisco	11/01
#26	Bellevue, WA	11/01
#27	Ottawa	11/01
#28	Los Angeles	11/02
#29	Atlanta	11/07
#30	Minneapolis	11/07
#31	Orange County, CA	11/08
#32	New York City	11/09
#33	Phoenix	11/09
#34	Boston	11/14
#35	Detroit	11/14
#36	Portland, OR	11/14
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#40	Cincinnati	11/16
#41	San Jose	11/16

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Workstation vendors face tough sell

BY JAMES DALY
CW STAFF

TEMPE, Ariz. — Although workstation makers would have you believe that they will be received like reigning royalty when they attempt to move into the commercial sector, it ain't necessarily so. According to a report prepared by The Sierra Group, Inc., the crossover strategy of most workstation vendors is so full of holes that it looks like aged Swiss cheese.

"The workstation market is much more narrow and fragile than it appears on the surface," reads the report, which is based on interviews with 835 companies.

"Nothing looks right here. The cost of entry is extraordinarily high. So high, in fact, that Sun may be the only pure workstation vendor able to attempt it," the report said.

While the performance of workstations has made them hot in the scientific and technical community, they have yet to make significant inroads among personal computer users in the lucrative commercial sector.

Jim Hammons, manager of the Tempe, Ariz.-based research firm's technology advisory services, said that many PC users are not ready to switch. "PC users want flexibility, and many are just not ready to make the concessions a switchover will require," he said.

Won't wait to play

Hammons said PC users want plug-and-play use of new software packages and do not want to wait for them to be ported to their workstation vendor's platform. Although PC applications can run on workstations using software or hardware coprocessors, it is native-mode applications that will make all the difference, Hammons said.

The firm's research also indicates that commercial users are not very interested in the factors that have driven the growth of workstation heavweights such as Sun Microsystems, Inc. Unix and reduced instruction set computing, for instance, rank at the bottom of the commercial users' strategic agenda.

Commercial users also tend to be very price-sensitive, the report noted, which will put even more pressure on the already slim margins of workstation suppliers.

Key elements in hastening the switch to the commercial market will include the growing acceptance of the Unix operating environment and the emergence of a common graphical user interface among workstation platforms.

Revelation plans get mixed review

BY RICHARD PASTORE
CW STAFF

Users interviewed last week hailed the embedded SQL and database server accessibility promised for the upcoming release of Revelation Technologies, Inc.'s database management system. But these and other features will also add several fathoms to the murky depth of functionality that some users complain is already over their heads.

Advanced Revelation Version 2.0, slated for formal announcement and shipment in November, will be able to import and manipulate files from Microsoft Corp.'s SQL Server and other database servers as well as ASCII files and Ashton-Tate Corp. Dbase.

The IBM Personal Computer-compatible package will make full use for the first time of a proprietary "environmental bonding" technique that allows it to access outside files without altering the files' original data structure, company officials said in recent interviews. This approach is intended to ensure that files residing on a database server, for instance, remain intact and accessible to other front-end applications.

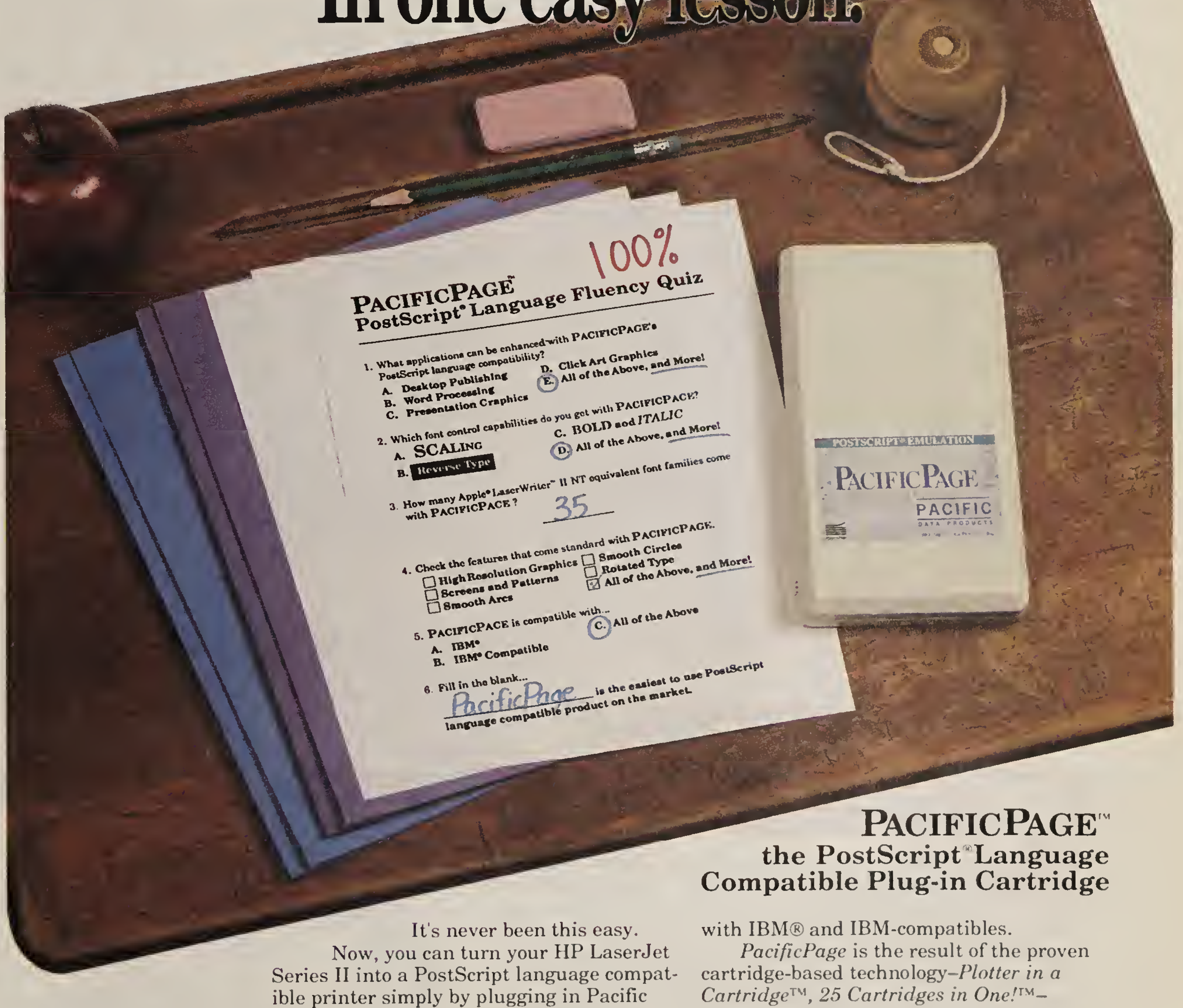
Users of older product versions were interested in the new features. However, there is already "so much to the product, it's hard to find the features you want to use," said Bill Webber, a health physicist at the National Institute of Standards and Technology.

Mark Bolgiano, information systems manager at the Greater Washington Board of Trade, agreed, adding, "A Revelation user's first day is hell because there's so much to understand. But the rest of your life is heaven because you don't run into its limitations."

Revelation is aware of users' concerns and is addressing them by increasing the use of examples in 2.0's documentation and restructuring the manual's organization, said Richard MackSoud, director of technical marketing.

Release 2.0 will require 640K bytes of random-access memory and a hard disk. The release can accommodate up to 4M bytes of expanded system memory and requires OS/2 or DOS 3.1 or higher.

The company will announce pricing in November. It is expected to be equivalent to Version 1.1's price of $950 for a full development copy.



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PhoenixPage

Gates on the stump to boost OS/2

BY ELLIS BOOKER
CW STAFF

CHICAGO — It's become a regular routine for Microsoft Corp.'s Bill Gates: extolling the advantages of OS/2 while answering nay-sayers in the crowd.

At the Computer Association for Microcomputer Professionals Conference (CAMP) two weeks ago, the Microsoft chairman and chief executive officer responded, as requested, to prepared audience questions about the future of OS/2 and its relationship to Microsoft Windows and MS-DOS. Among his statements and predictions to the 1,100 CAMP attendees were the following:

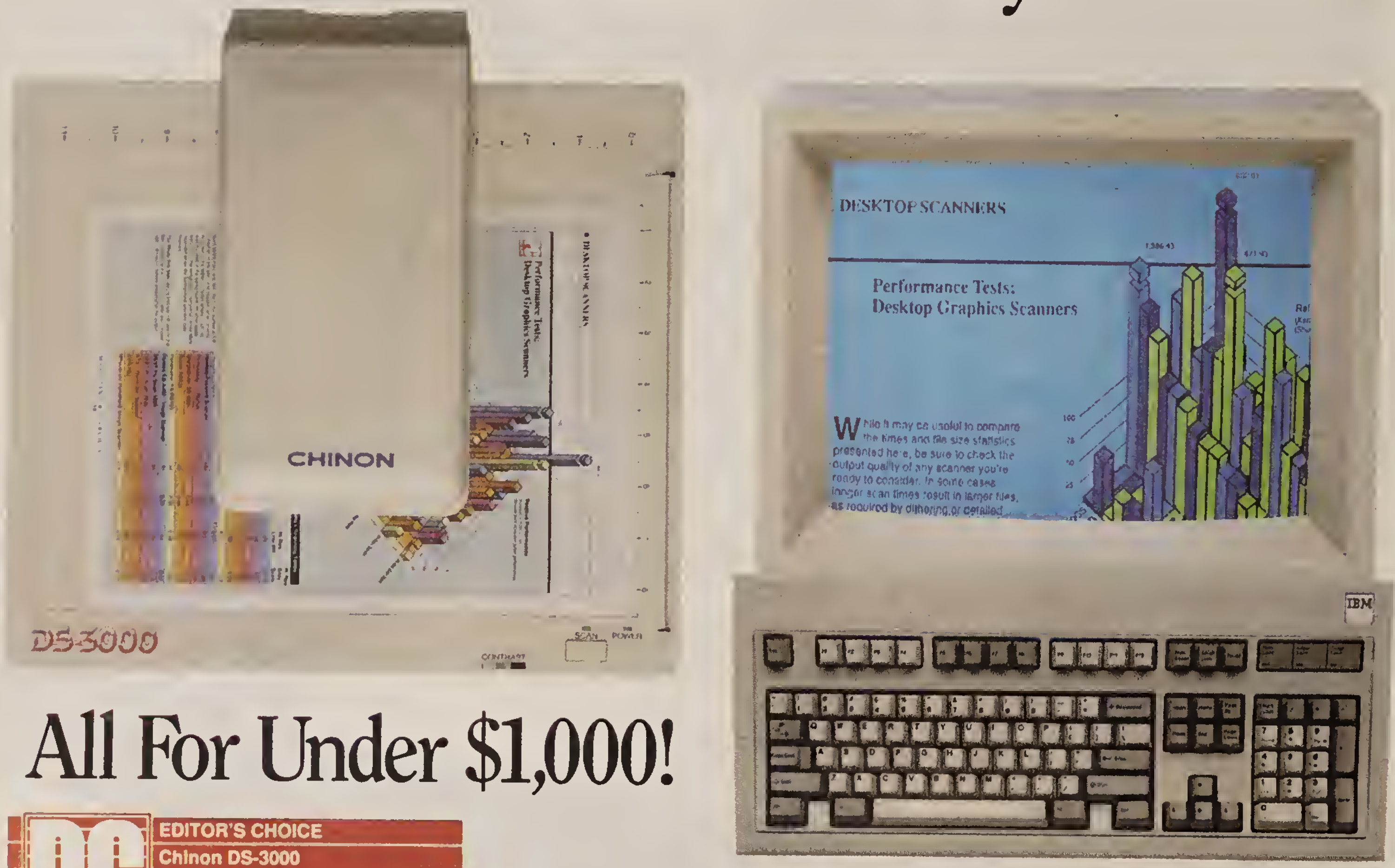
- One million copies of OS/2 will be sold during 1990, compared with 10 million copies of DOS.
- Of all personal computers, 12% now run Windows, and this number will rise dramatically over the next year.
- OS/2 is selling as well as all flavors of PC Unix combined.

Asked about a future relationship for OS/2 and Unix, Gates put off the prospect. "It's possible," he said, "that as you move to more advanced things — like object orientation — Unix will not move quite as quickly [as OS/2]." He added that the "committee decision-process" for the different Unix varieties may also slow its market acceptance.

Also, Gates did not encourage speculation that OS/2 would be ported to other architectures: "We're not going to have source codes in Egghead [Discount Software] stores where administrative assistants are re-compiling source codes and editing printer drivers for different systems."

A Microsoft spokesperson clarified Gates' remarks last week by explaining that Microsoft had described plans for a portable version of OS/2 at its systems software seminar in February but has not indicated dates or what it would be for.

CAMP attendees also got a peek at OS/2 Version 1.2 for Intel Corp. 80286-based machines. Notable changes that Gates demonstrated include a somewhat different graphical user interface; a reduction in the program's memory overhead requirement and an increase of 40K bytes, to more than 520K bytes, allotted to applications running in an OS/2 "compatibility box."



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U.S. Trust

FROM PAGE 39

write-once read-many cartridges storing as much as 150G bytes of data. The units are linked via Banyan Systems, Inc.'s Virtual Networking Software, or Vines.

The system has been in pilot phase at the company's midtown Manhattan headquarters for more than a year. In mid-October, according to Aisenbrey, U.S. Trust will be ready to implement the full complement of 140 retrieval stations and link its remote locations in Palm Beach, Fla., Dallas and Los Angeles over leased lines.

The firm has already been able to cut the number of employees needed to manage documents in the trust department from 17 to five, Aisenbrey said.

Companywide, the system is expected to eliminate the need to provide on-site storage space for paper documents — a costly condition in Manhattan. Backup documents will be stashed in a warehouse located on less expensive New Jersey real estate.

The company expects payback on the full system by 1992 or 1993, Aisenbrey said.

As with most new technologies, there were several sticky situations to solve, Aisenbrey said. "Most of the problems related to identifying and putting together an appropriate network and laying it out so that traffic congestion could be kept at a minimum."

The company eventually used Vines to link the retrieval stations together and tie them to its IBM mainframe so that host-based data could be downloaded directly to optical disc.

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New Wave combines best of DOS, Macintosh, users say

ANALYSIS

BY JEAN S. BOZMAN
CW STAFF

CUPERTINO, Calif. — Is Hewlett-Packard Co.'s New Wave something new under the sun?

Quite possibly, industry analysts and early users are saying. The product may bridge the cultural gap between the look and feel of the IBM Personal Computer's DOS applications and Apple Computer, Inc.'s Macintosh environment.

On its PC-compatible side, New Wave can "wrap around" many standard DOS applications such as Lotus Development Corp.'s 1-2-3 and Microsoft Corp.'s Excel spreadsheet packages. Since New Wave is an extension of Microsoft's Windows, any Windows-compliant application can be imported to it, said Webb McKinney, general manager of HP's Information Systems Division in Santa Clara, Calif. An on-board Help menu assists New Wave users in porting over DOS applications that run under Windows.

This "encapsulation" process allows users to move PC spreadsheets around their New Wave desktop with the mouse and icon interface more familiar to Mac users. Unlike the Mac interface, New Wave objects can be dragged by a mouse and directly integrated into a second application, similar to the X Window System environment. The Mac interface uses a clipboard device to accomplish the same action in two steps by cutting and pasting.

The similarity between the two environments, while generic, provoked Apple to name New Wave in its recent software infringement suit.

Early users said that New Wave's object-oriented memory manager breaks new ground. The way New Wave stores all objects as unique elements in a central database allows New Wave users to share these objects, such as graphs or reports, between applications. When any object, such as a spreadsheet, is changed, the new numbers are automatically updated, such as in a pie chart built on spreadsheet numbers.

Hot-linking

"It's really pretty neat," said Rod Morgan, staff manager for systems and information technology support at US West in Phoenix. "New Wave is the next step beyond Microsoft Windows and the Mac environment. But from my point of view, it's the concept of hot-linking data across applications that is the magic in New Wave."

Morgan, who has been troubleshooting New Wave for several months as a beta-test user, is building an executive-support system on New Wave because of its ease of use.

"You're not working specifically with an application," Morgan said. "You're working with data that is independent of the application program that's manipulating it." Morgan's prototype executive system combines word processing, a spreadsheet and a graphics package under New Wave.

New Wave's September release gives it the edge on competing products, some analysts said.

"There's nothing else out there to compete with New Wave right now," said John McCarthy, director of professional research at Forrester Research, Inc. in Cambridge, Mass., and a New Wave user. "The Mac's been out there for five years, virtually unchanged, and the closest thing to New Wave is offered by Next. And that's late in shipping." The Mac's System 7.0 operating system, due next year, is expected to compete with New Wave's features.

One flaw in the first release of New Wave — now available only from HP's sales force — is its lack of a robust agent facility [CW, Sept. 4]. The "agent" represented on-screen by a blonde-haired fellow in sunglasses is supposed to function as the user's personal assistant. It will be able to mimic a user's keyboard and mouse actions for later repetition — ordering the downloading of a file overnight, for example. For now, the agent follows only scripted directions, HP said.

The entire agent facility will not be available until New Wave's second release sometime in the first quarter of 1990, said New Wave product manager Steve Grey. That is about the time when users should be able to find New Wave in their nearby computer-retail outlets. Until November or December, users will have to call HP to place an order, HP said.

HP intends to sell New Wave as an independent product, free of any tie to standard HP product lines. In this respect, it will be like the HP Laserjet printer, analysts said. But there may be a tie-in for information systems purchasers, McKinney said.

"We've written New Wave's Mail package to connect to the HP 3000," he said. "Our goal is to have portable applications that can be used across our product line, including our Unix-based systems." That way, he explained, HP can leverage any gains made on the New Wave desktop with HP's traditional strengths on the computer-room floor.

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Keefe

CONTINUED FROM PAGE 39

boxes and boards are being promised, announced or demonstrated, despite reports that the chip itself is going to be late. And posturing vis-a-vis the 586(!) chip is beginning to hit the airwaves.

Meanwhile, the autumn dog-and-pony season should produce a herd of Extended Industry Standard Architecture (EISA) micros, assuming that the schedule for that chip isn't also out of kilter.

And why not? Intel, allegedly at Compaq's instigation, has turned to Texas Instruments for help in developing the EISA bus. Yet TI is fumbling with its own chip problems, specifically the 4M/16M bit/sec. Token-Ring chip set.

And then there's always Unix — ever the bridesmaid. But most users eschew the pioneer role and would rather wait out the last days of sniping between AT&T, IBM and their respective vendors-in-waiting, who eventually will determine the peculiarities of the coming (and hopefully last) Unix standard ever.

Don't mess up a good thing. While the future struggles clumsily to get off its feet, I'll wager that many users are perfectly happy with their trusty Intel 80286 and even 8088 personal computers, which may or may not be attached to a 386-based file server.

A user such as Leeland Hutchinson, a partner at the Chicago law firm of Freeborn & Peters, isn't necessarily looking to turbocharge his shop. More realistically, he wants a gradual growth path for his ample base of DOS. He especially wants to preserve his investment in IBM PC ATs and low-end Personal System/2s. Yet IBM is recommending that OS/2 users move to the PS/2 Model 50Z or 55SX.

"A lot of IBM's recent strategy appears to require a significant investment in equipment at the workstation level, whereas the [third-party LAN Manager] approach focuses on making the file server high-powered. But the workstations don't have to be," he added.

That, to Hutchinson and a lot of other users, is a much more reasonable approach, especially since the average user only knows how to do a few things on the PC. Yet everytime you speak to a vendor or open a trade rag, you find yourself back to the very uncertain future.

For example, despite obvious user support for the product, many industry observers believe Intel is deliberately trying to deep-six its 286 platform. Microsoft Chairman Bill Gates was quoted recently as saying that as far as his company is concerned, the 286 is dead. Now whether that is because Microsoft never fully delivered on its protected-mode 286 DOS operating system — attributed in part to Intel's delivery of a "brain-dead" chip — or whether Intel is simply anxious to sell its new and improved processors is anyone's guess. But I'm sure it's not because these people have users' best interests at heart.

In fact, the whole thing sounds pretty self-serving to me. But users may get the last laugh. While vendors struggle to meet preannounced ship dates for technology that many users see no immediate need for, financial analysts have been keeping an eyeball peeled on user buying trends. What they're seeing amounts to a big, fat slowdown in PC hardware sales, which they predict will result in large-scale discounting.

This trend is likely to continue. The more complex and expensive the technology, the longer the sales cycle is going to take and the more users are going to insist on seeing the complete picture before laying down cold cash.

Keefe is a *Computerworld* senior editor, PCs and workstations.

Computer flu

CONTINUED FROM PAGE 39

consideration are antivirus programs such as "vaccines," which attempt to identify viruses before they infect programs, and "antidotes," which search for and eliminate virus code. Both offer some protection but usually are aimed at specific strains or types and are not always effective, according to some users.

The obvious solution is to completely isolate PCs and restrict their use. Also, it is possible to require end users to adhere to a strict code of conduct aimed at barring them from transporting software between home and office, using shareware and similar practices. But these remedies, while effective, are not necessarily practical or even desirable, Kessler said.

Many companies are evaluating call-back modems — particularly for PCs that can be accessed via modem, because they are particularly vulnerable to unwanted snooping and electronic vandalism.

A call-back modem prompts a caller for a password and hangs up. After searching a password file to verify that the caller is an authorized user, the modem returns the call and establishes communication.

Users with extremely sensitive data are increasingly relying on hardware and software that encrypts and decrypts files to ensure that someone cannot read or alter data that is stored or in the process of being transmitted, according to Stuart Katzke, chief of computer security at the National Computer Systems Laboratory, a division of the National Institute of Standards and Technology (NIST).

NIST developed the Data Encryption Standard, an encryption algorithm that is now being widely used by federal government agencies and corporations.

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Schmidt Enterprises
7448 Newcastle Ave.
Reseda, Calif. 91335
818-342-5930

Prime Computer, Inc. announced that it has upgraded its microcomputer-based graphics translator.

Version 3.2 of Personal Initial Graphics Exchange Specification reportedly contains increased support of figures, construction lines, parametric spline curves, ellipses and dimensions. The product is said to be compatible with Prime's family of computer-aided design and manufacturing software.

The package was developed for use with Computervision Corp.'s Personal Designer and Personal Machinist software. It costs $1,300.

Prime
Prime Park
Natick, Mass. 01760
508-655-8000

Software utilities

Vericomp has announced a software product reportedly designed to ease the DOS 640K-byte memory constraint in the IBM Personal Computer, AT, Personal System/2 and compatibles.

Memory Master is said to provide four different methods of increasing the amount of available conventional memory, the desired combination of which is dependent on the user's hardware configuration and applications being used.

The software retails at $49.95, with dealer and distributor discounts available.

Vericomp
P.O. Box 23360
San Diego, Calif. 92123
619-277-0400

Athena Software has announced a utility program for organizing and reclaiming hard-disk space for IBM Personal Computer, AT and compatible users. Disc Director reportedly eliminates wasted space by finding unused duplicate files, empty and inefficient directories and orphan files.

According to the company, the menu-driven program helps users logically reorganize tree structures and permits them to attach 78-character comments to directories, files and drives. Requirements include DOS Version 2.0 or higher and 512K bytes of random-access memory. The price is $79, with site licenses available.

Athena Software
663 West Aspen Way
Louisville, Colo. 80027
303-666-9569

Worldwide Software, Inc. has introduced a software package that reportedly protects personal computer users from potential computer virus activity before damage is done.

Version 3.0 of the Personal Computer Virus Immunization Toolkit reportedly monitors system-endangering DOS interrupts, maintains a record of the contents of executable files to track changes and scans disks for virus-like code. According to the company, utilities are included to copy the image of the CMOS table to a user-definable medium for restoration in case of viral intrusion or battery failure. Another utility masks write operations of the hard disk to allow safe testing of new software.

The price is $99.95, and an upgrade program is available.

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DATA STREAM

Bruce Richardson

Three steps to integration

The dominant theme in manufacturing plant computing — and much of the general-purpose market — is information integration. The goal is to seamlessly combine applications and data for a single-system view of plant operations.

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Stage One involves defining the advanced application environment (AAE), a set of guidelines for a common user interface, an application programming interface (API), DBMS

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Inside

- Net management plan unfolds at Racal-Milgo. Page 54.
- MAP used at only 1% of industrial sites, study says. Page 55.
- McDonnell Douglas is addicted to videoconferencing. Page 56.

Networld draws LANs together

Focus is on companywide connectivity, smarter bridges, Token-Rings

BY CHARLES VON SIMSON
and ELISABETH HORWITT
CW STAFF

DALLAS — Local-area network management and interconnectivity dominated the product introductions at last week's Networld '89 conference, reflecting users' increasing demand for tools to integrate their isolated LAN installations into a reliable corporatewide networking system.

The major artillery displayed at the show included more intelligent bridges, Token-Ring interconnectivity and faster throughput.

"We see a lot of demand from the Fortune 1,000 for wide-area connectivity," said Mary Modahl, network analyst at Forrester Research, Inc. in Cambridge, Mass. "But these large companies are moving toward the robust functionality of routers. There is a large difference in the sophistication of the technology, and a number of vendors will not be able to make the leap."

Some bridge vendors are trying to claim the "router" title by adding intelligence to their products.

RAD Data Communications, Inc., for example, announced a Token-Ring version of its "brouter" that is said to combine the functionality of a transparent bridge with a smart router.

The box is said to have a router's ability to support multiple paths between LANs and avoid the dreaded "loop" situation in which a packet circulates endlessly from one LAN to the next. However, RAD's bridge-like protocol-independence disqualifies it as a router, according to strict definition.

Also in the Token-Ring arena, Rabbit Software Corp. in Malvern, Pa., announced a Token-Ring version of its Rabbitgate gateway between LANs and IBM hosts, with higher throughput than any other gateway of its type, according to Rabbit.

Gateway Communications, Inc. announced support for Novell, Inc.'s Advanced Netware 386 operating system across its entire line of LAN bridges and gateways.

Netronix, Inc. in Petaluma, Calif., announced Ethermaster 13000 Bridge, which is said to provide throughput of up to

Continued on page 58

Bridges and routers on the rise

Companies will spend big bucks to interconnect their LAN-based users and resources on a corporatewide basis

	Value of U.S. shipments in millions					
	1988	1989	1990	1991	1992	1993
Local bridges	$32	$46.6	$62.2	$79.6	$100.7	$126.9
Remote bridges	$46.3	$67.5	$101.1	$159.9	$237.1	$331.9
Routers	$48	$67.2	$96.6	$147.8	$235.4	$402.2
Gateways	$46	$62.1	$86.3	$127.1	$220.9	$407.7
Total	$172.3	$243.4	$346.2	$514.4	$794.1	$1,268.7

SOURCE: FORRESTER RESEARCH, INC.

CW CHART: JOHN YORK

TCP/IP: A hint of IBM multivendor connections

BY ELLIS BOOKER
CW STAFF

WHITE PLAINS, N.Y. — IBM's recent addition of Transmission Control Protocol/Internet Protocol support in the Application System/400's operating system may be an acknowledgment that its year-old midrange processor may be used in many non-IBM environments.

"In the absence of true, standard Open System Interconnection [products], TCP/IP is the only common communications standard," said Lee Doyle, manager of local-area network research at International Data Corp. in Framingham, Mass.

Doyle noted that Digital Equipment Corp. VAXs, many Unix workstations and personal computers speak some brand of TCP/IP and that this is the networking protocol currently required by the U.S. Department of Defense.

The AS/400's TCP/IP, which IBM said will be available next March, permits an AS/400 to communicate with other systems running TCP/IP over either a 4M bit/sec. IBM Token-Ring network, Ethernet Version 2 or IEEE 802.3 LANs.

At its announcement, IBM demonstrated the potential of a TCP/IP link, connecting workstations from Hewlett-Packard Co.'s Apollo division and Sun Microsystems, Inc. to an AS/400 over an IBM Token-Ring network.

However, to complete a TCP/IP connection, the Token-Ring must be connected to the Ethernet network via an interface device — the IBM 8209 LAN Bridge. The bridge, which sells for $6,265, with its $935 Ethernet attachment feature will be available Oct. 20, according to IBM.

The bridge is needed because IBM does not have native Ethernet on the AS/400, according to Doyle. "They've said they would have Ethernet for a while," he said, adding that native Ethernet on the AS/400 would obviate the need for the LAN bridge. The drawback of the bridge, Doyle continued, is that "anytime you do a protocol conversion, you

Continued on page 56

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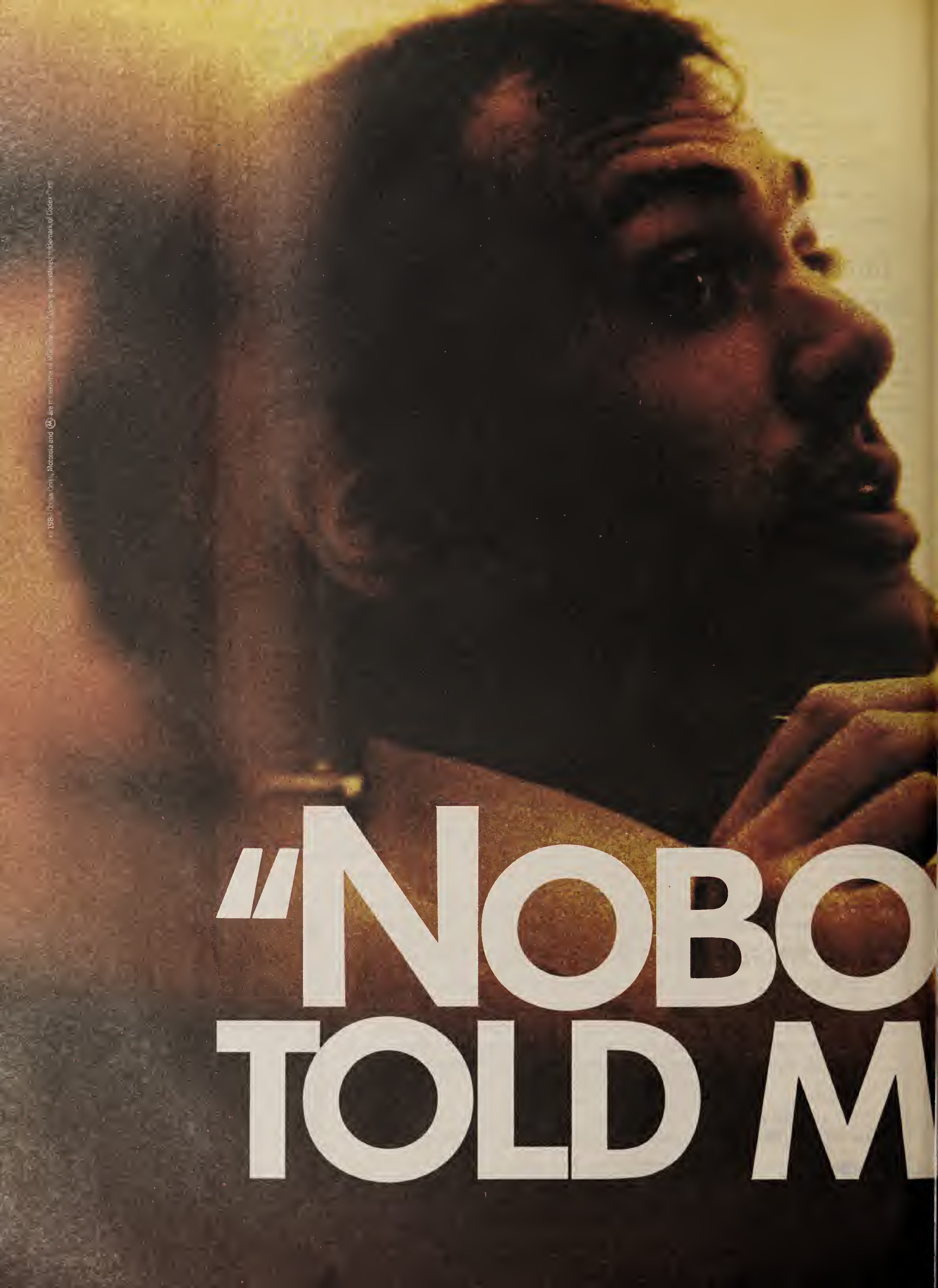

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Racal-Milgo net strategy seeks its own levels

BY JOANIE M. WEXLER
CW STAFF

SUNRISE, Fla. — A five-level integrated network management strategy has been unfolding at Racal-Milgo since the release of the Multilink 4 windowing system at last year's Telecommunications Association (TCA) show.

The most recent development, a network management system announced late last month for the vendor's Omnimux 8000 networking T1 multiplexers, signified that virtually all of the company's products are centrally manageable under its Communications Management Series (CMS) network management system, Racal-Milgo said.

The goal of the strategy is to first provide users with integrated management of all Racal-Milgo products from a single workstation and ultimately give them a gateway into the interoperable world of Open Systems Interconnect (OSI), said company spokesman Peter Corr.

While waiting for the OSI network management standard to solidify, Racal-Milgo is supporting the two de facto standards; IBM's Netview — with an existing interface — and AT&T's Unified Network Management Architecture — with a planned interface. However, Racal-Milgo sees Netview as the best way to piggyback OSI status, Corr said.

The route the company is taking is a wise one, according to Barry Gilbert, principal at TFS, Inc., a research and consulting firm in Westford, Mass. "Users are apprehensive about installing things that don't open up to other products," he said. The company is offering a top-down strategy for compatibility, looking at the organization as a whole and consolidating it into one cohesive arrangement.

Four eyes

Last year's Multilink 4 announcement provided a fundamental level of integration, allowing users to view four Digital Equipment Corp. VT220-compatible network management systems in different windows of the same workstation. Multilink 4 serves the first three tiers of the vendor's five-level application matrix of increasingly complex networks, including X.25 packet-switched networks and those based on the company's Omnimux 7000 T1 multiplexer. The 7000 will be introduced at the TCA show this month.

The newly announced CMS 8800, based on the IBM Personal System/2 and scheduled to ship in November, falls in the fourth tier, managing two- to 10-node T1 networks configured with the Omnimux 8000.

The CMS 8800 integrates the management of analog and digital tail-circuit networks of modems, digital service units and time-division/statistical multiplexers controlled by the vendor's CMS 2000 network management system. It also integrates the alarm and alert functions of the Omnimux 8000, CMS 2000 and CMS System Performance Analyzer with a common user presentation. Corr said that this means users do not need to separate monitors or windowing for alarms and alerts.

Additional alarm integration occurs when the CMS 8800 is configured with Release 2.0 of Racal-Milgo's CMS/View interface to Netview. The system supports the attachment of multiple alarm streams from Omnimux 8000s and CMS 2000s and integrates them in a single stream through CMS/View to Netview. Previously, multiple paths were required.

The fifth level addressed by Racal-Milgo's plan is the management of greater-than-six-node T1 networks configured with Omnimux 9000 T1 multiplexers and Omnimux 9000 network management systems.

The firm plans to develop management systems for its dial-up modems, command structure and database integration, as well as interoperable gateways into other vendors' equipment.

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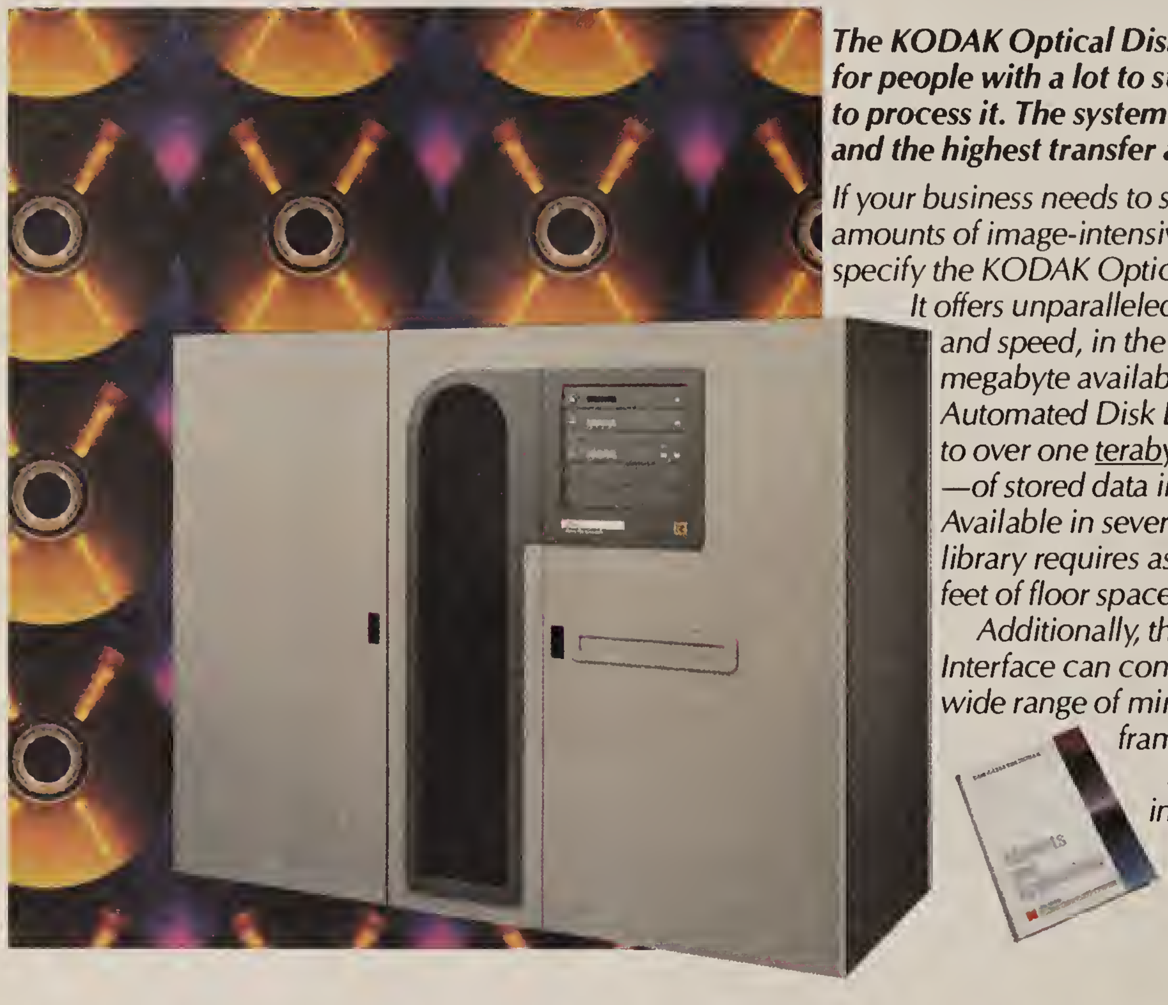

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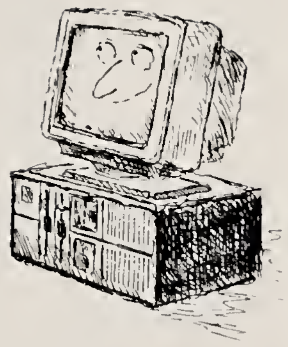
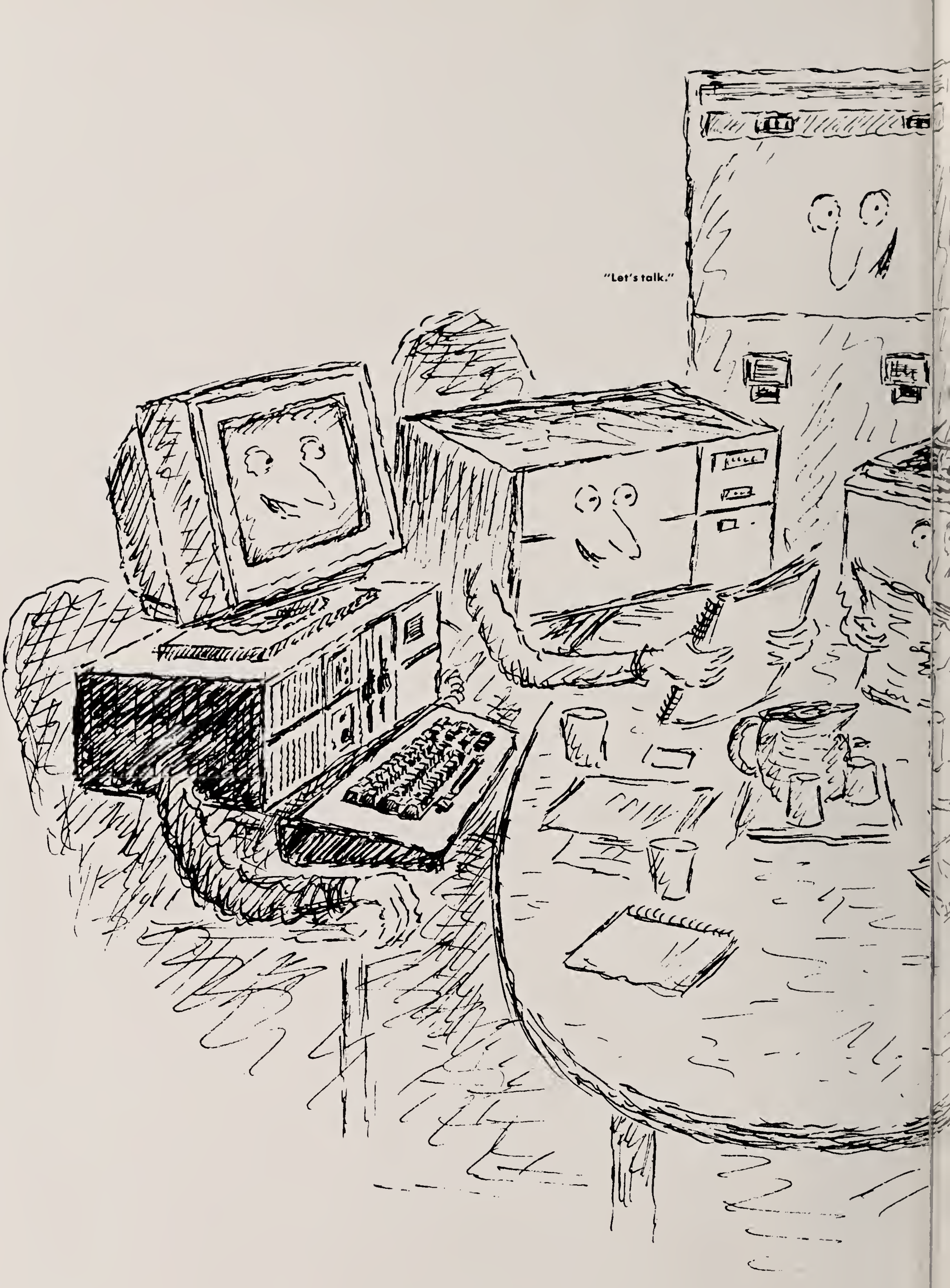


MEMOREX TELEX



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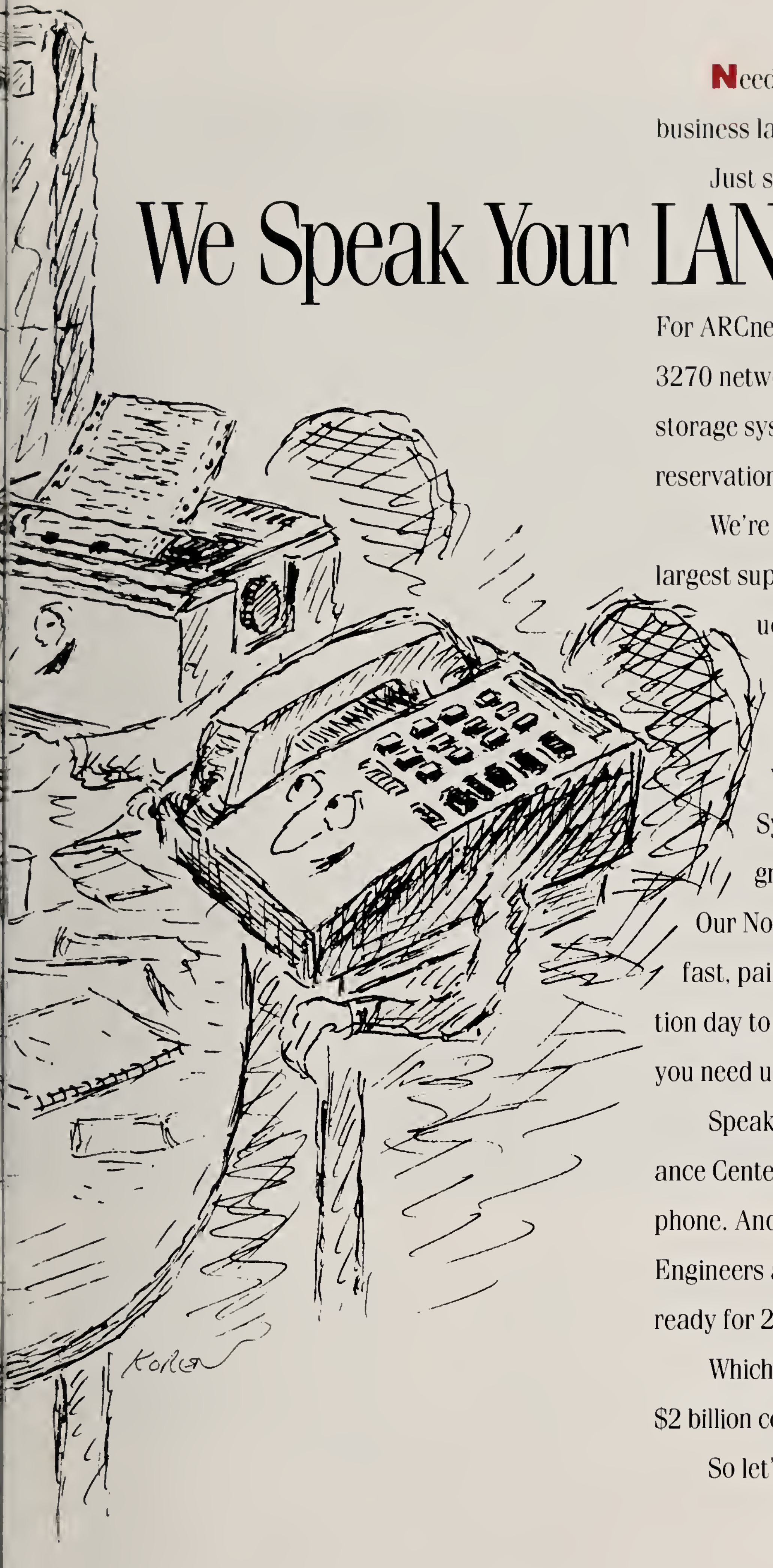
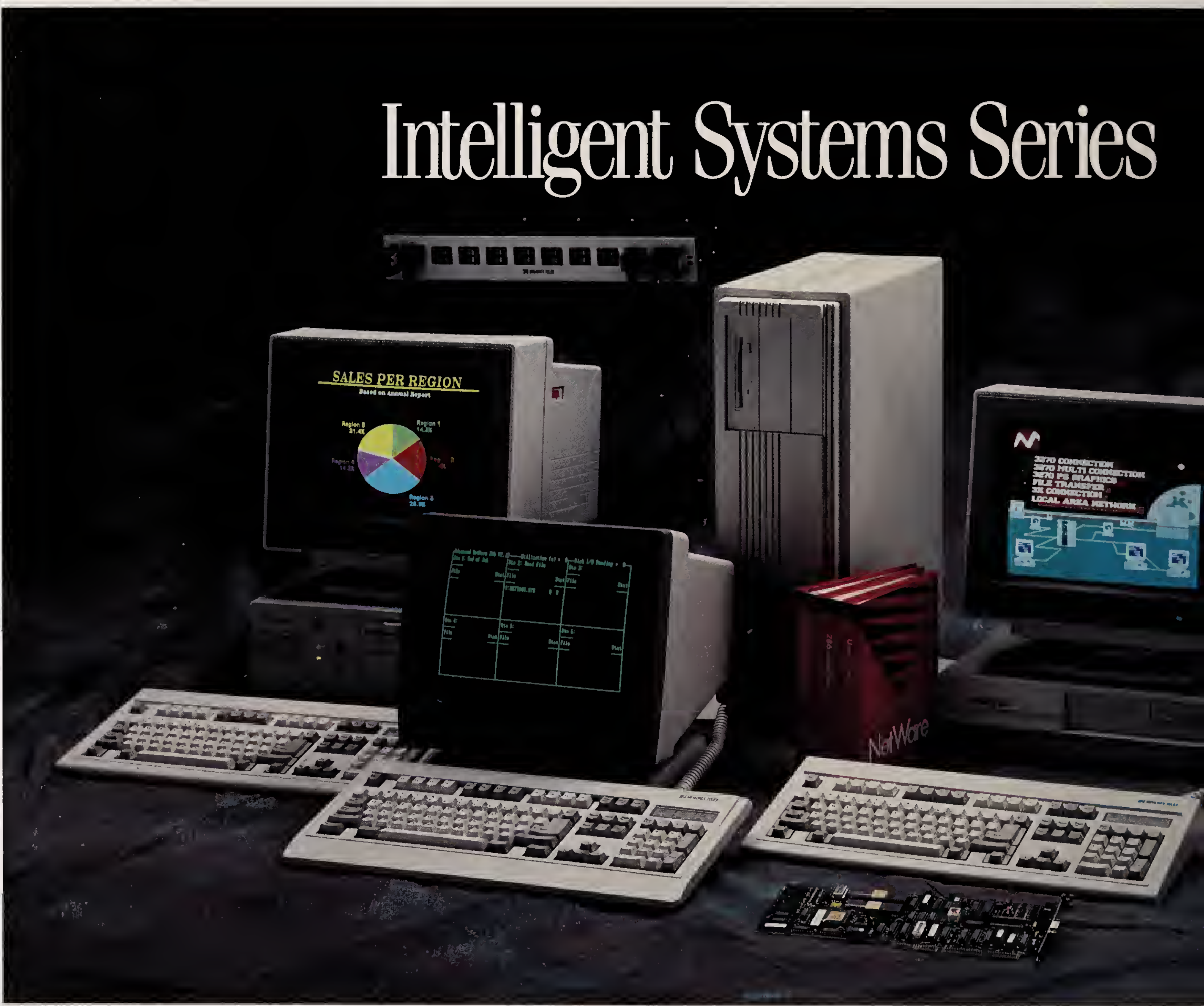


7070 NETWORK SERVER

7045 INTELLIGENT WORKSTATION

7040 INTELLIGENT WORKSTATION

Intelligent Systems Series



The **7045 Intelligent Workstation** gives you full desktop capacity in a smaller package. We integrated video support and diskette control in the base system to give you six expansion slots for a full range of communications or other options. Standard 1MB of RAM and 80286 operation at 8/12MHz or 8/16MHz. The companion **7065** offers 16MHz or 20MHz 80386 microprocessing, making either unit a high-performance solution for a LAN, as a LAN server, or standalone.

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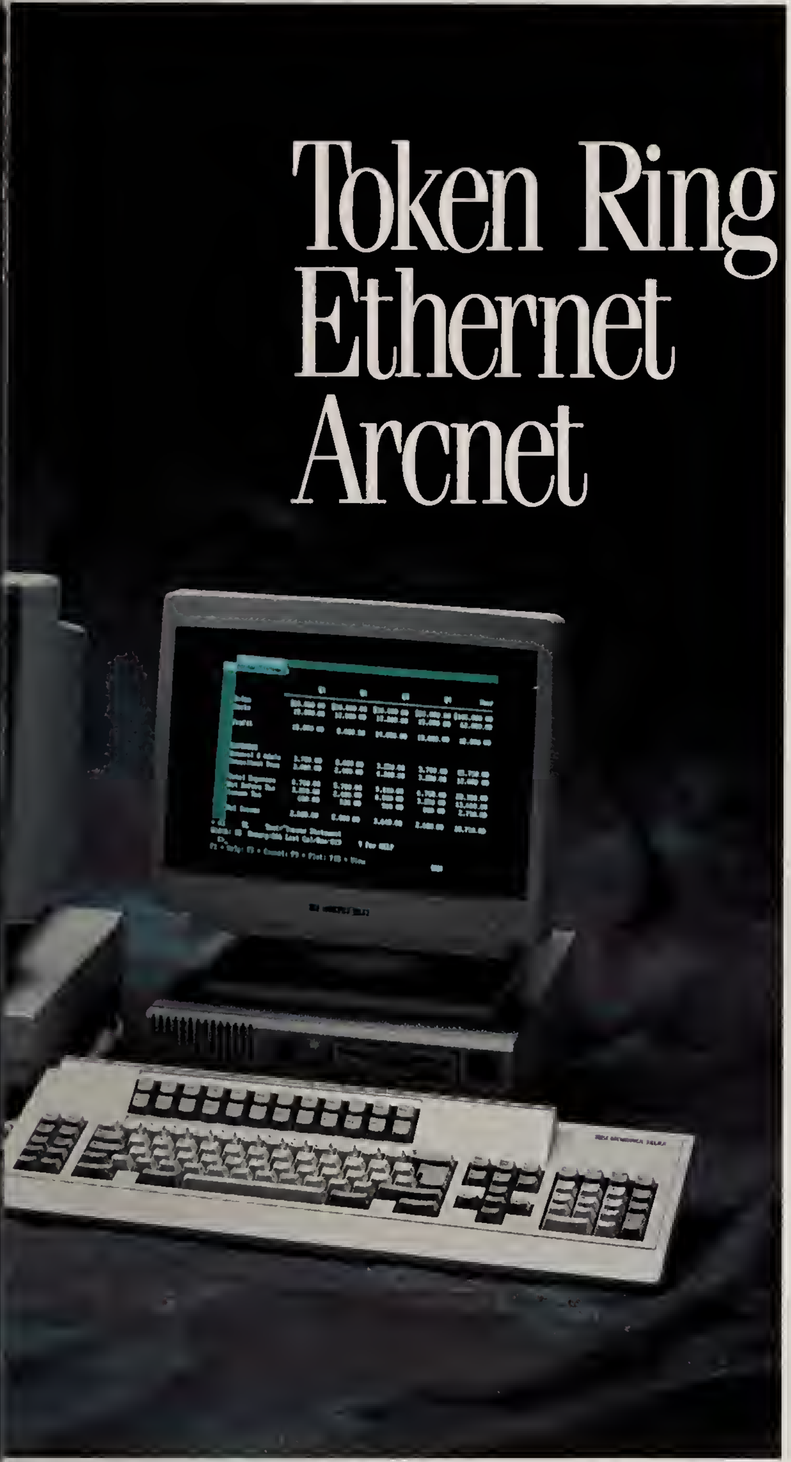
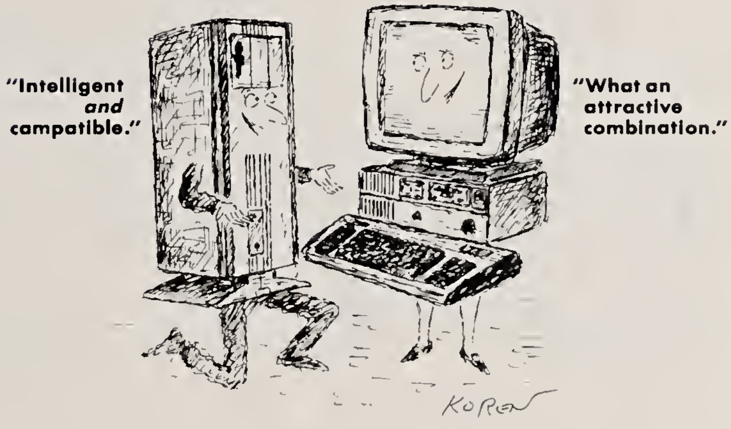


*The industry standard for packing big 12MHz performance in a small footprint. An excellent solution for both LAN or standalone applications, the **7025 Intelligent Workstation** also features integrated disk and video controllers, providing two expansion slots for add-in adapter boards.*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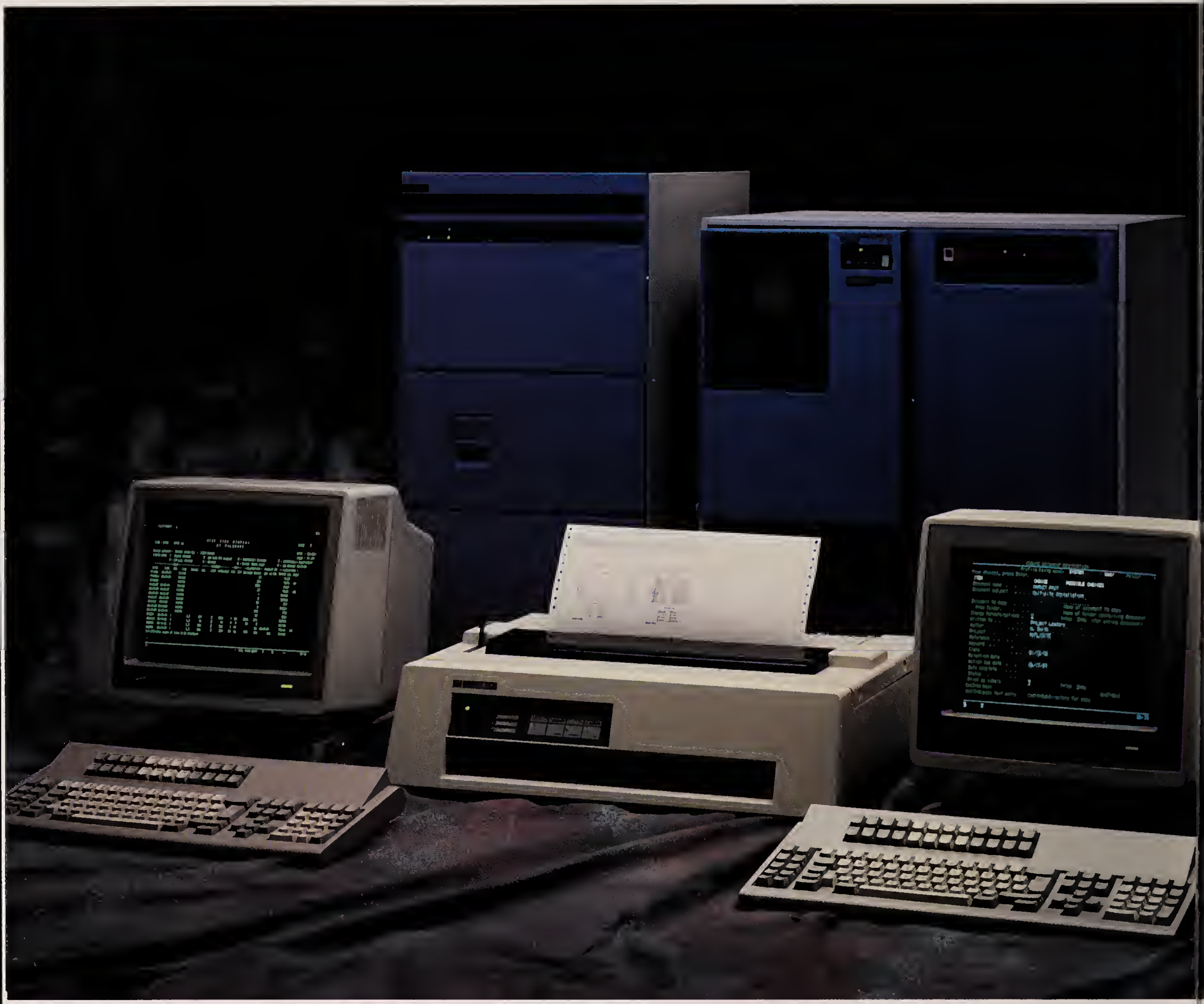
5460 TAPE CARTRIDGE SUBSYSTEM
3261/81T TAPE SUBSYSTEM
1197-D/W2 DISPLAY STATION
1224 PRINTER SERIES
1197-C2 COLOR DISPLAY STATION

An ergonomic and highly functional display available with green, amber or black-on-white 15" monitor, the ***1197-D/W2 Display Station*** *is capable of 3,650-character display and split-screen mode. Supports up to three concurrent sessions (two displays and one printer) and 83-, 102- or 122-key keyboards. Features print trim, host-addressable printing and support of twisted pair or twinaxial cabling.*

The ***1224*** *series of intelligent 4224-compatible desktop matrix printers utilizes the advanced functions of IPDS support such as graphs and barcodes. 256K or 512K memory. Handles 250 or 400 cps in one, four or eight colors and offers versatile paper-handling capabilities.*

Offering brilliant, two- or seven-color display modes, the ***1197-C2 Color Display Station*** *supports up to three concurrent sessions (two display and one printer) and four terminal modes. Use with 83-, 102- or 122-key keyboards. More features include print trim, host-addressable printing, and support of twisted pair or twin-axial cabling.*

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1196 A/B
DISPLAY STATION

If you're unaware of Memorex Telex's total commitment to midrange users, consider this fact: We offer you the world's most comprehensive **S/3X and AS/400™ ENVIRONMENT** line of plug-compatible products for S/3X and AS/400 environments. Period.

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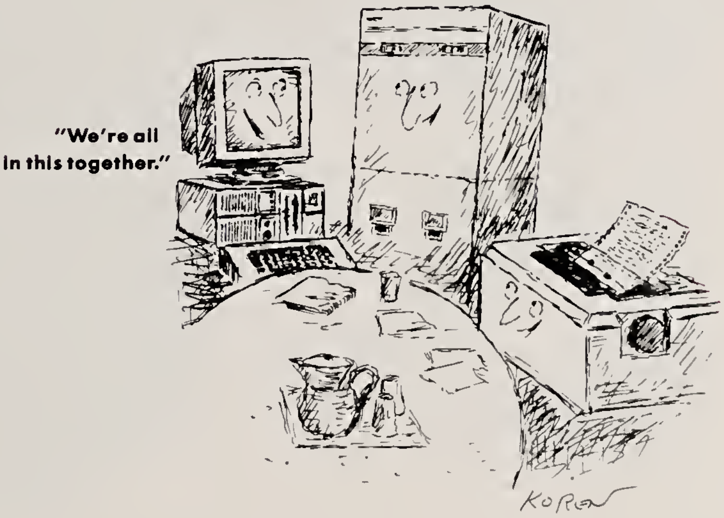
*The **1196 A/B** full-function 12" Monochrome Display Station features a choice of 83-, 102- or 122-key keyboards as well as host-addressable print support. Supports twisted pair or twinaxial cabling.*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3890 DISK DRIVE SUBSYSTEM

6890 SOLID STATE SUBSYSTEM

The ***3890 Disk Drive Subsystem***, *our latest generation of disk drives, is an innovative approach to triple capacity. We reduced head disk assembly size to eight inches (from 14") to improve reliability and serviceability. And to offer the industry's best price and capacity per square foot.*

5480/SP2 CARTRIDGE
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All with floorspace savings that crowd neither computer rooms nor budgets.

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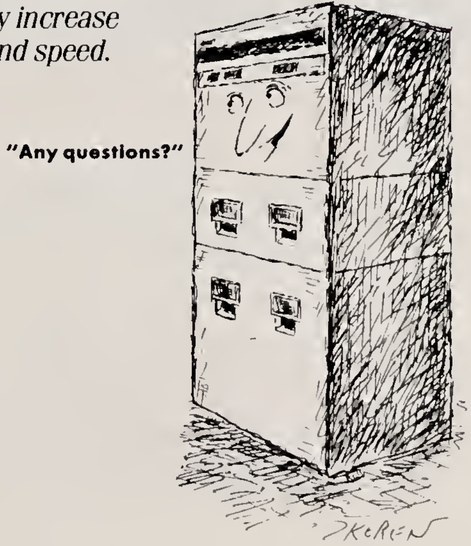
*1Mbit semiconductor storage technology makes the **6890 Solid State Subsystem** high-performance system perfect for critical, frequently-accessed data. Solid state means no moving parts and no seek time. Its thousands of operations per second boost user productivity. Holds both temporary system files and permanent production data.*

*We're building on the success and reliability of the **5480 Cartridge Tape Subsystem** with a simple, space-saving idea: stack them! This **5480 Special Package** offers the highest capacity-per-square-foot in the industry, and sets new standards for ease of operation and maintainability. New robotic options vastly increase data handling flexibility and speed.*



The highly-reliable choice for high volume printing, the ***1324 Coax Matrix Printer*** is rugged, supports IPDS and is user-friendly. Forms modules make swap-outs fast and keep paper alignment perfect. Handles four- and eight-color printing. Best of all, its LCD message center speaks in English, not cryptic codes.

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With an array of screen sizes, specialized keyboards and a new modular design, the ***1192 Enhanced Display*** series launches an era of enhanced operator productivity. These displays offer features you can't find on other 3270 products — programmable-base colors, field marking for clear identification of data entry fields, screen sizes up to 132 columns, on-screen calculator functions and local screen print capability for easy deskside copy.

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3270 NETWORKS

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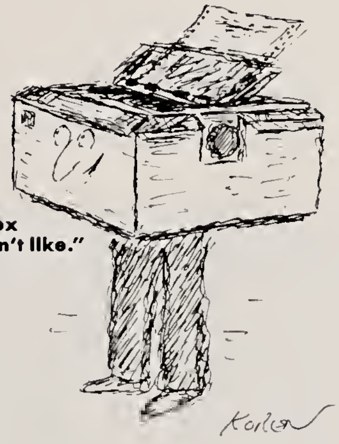

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MAP showing limited growth, study says

BY ELLIS BOOKER
CW STAFF

BOSTON — Even with the muscular evangelism of firms such as General Motors Corp., only 1% of all U.S. industrial sites have deployed a Manufacturing Automation Protocol (MAP) network, according to a recent report by The Yankee Group.

MAP, a factory-floor communications protocol based on the International Open Systems Interconnect model, has been slow to emerge because the open standard is less mature than proprietary alternatives, said Keith Belton, director of The Yankee Group's manufacturing automation planning service and author of the report.

Belton pointed out that MAP has only recently added some important features, such as a messaging specification and support for FTAM. He said the jury is still out on wide-scale acceptance of the standard.

Yankee Group forecasts put the domestic market for MAP-based hardware, software and services at just $25 million this year, $36 million next year and up to $70.2 million by 1993.

Meanwhile, Belton pointed to one indication of discord among the MAP proponent companies. Boeing Co., which along with GM has been one of the champions of MAP — and MAP's complementary office protocol, Technical and Office Protocol (TOP) — recently deviated from the Token-Bus specification for MAP transport media and instead used an Ethernet network in a new sheet metal plant.

Indeed, Belton's survey predicted that Ethernet, which currently represents about 23.1% of all industrial networks, will grow 30% in use by 1992. Meanwhile, IBM's Systems Network Architecture and "other" proprietary networks account for 26.5% and 29.7%, respectively, of existing industrial networks.

Finally, the influence of GM and Boeing, which have jointly shepherded the developing MAP standard and remain powerful entities inside the 5-year-old MAP/TOP Users Group, might not always have been a good thing, Belton said.

> THE INFLUENCE of GM and Boeing, which have jointly shepherded the developing MAP standard, might not always have been a good thing.

GM and Boeing, he said, needed MAP to support a broadband specification because of the nature of their existing factory networks and so missed the boat when it came to other media — notably fiber optics.

"I've been disappointed with the movement toward a fiber-optic standard," Belton said.

However, Mike Kaminski, manager of CIM/Networking technology at General Motors' Advanced Engineering Staff, said that the fiber standard is moving ahead and "that we'll probably see a specification before some issues are completely resolved; it'll be an optional sort of thing.

"Yes, I'm a little disappointed in the movement [toward MAP] here in the U.S.," Kaminski said. However, he added that "MAP, and to some degree, TOP, are going great-guns in Europe."

He said that the common European market, slated for 1992, has fueled activity in standards-setting there. MAP is on the European agenda through the public and private funding of the European Strategic Program for Research in Information Technology. In Japan, the government-run Ministry of International Trade and Industry is promoting the standard, Kaminski said.

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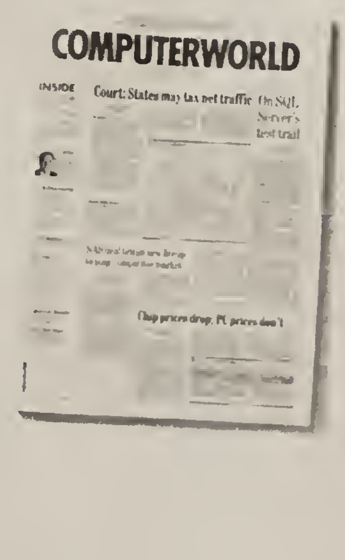
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McDonnell Douglas video hits big time

ON SITE

BY ELISABETH HORWITT
CW STAFF

ST. LOUIS — For McDonnell Douglas Corp., videoconferencing is the next best thing to being there.

In the five years since the company installed its first system, videoconferencing has gone from being an exotic luxury installed in a few specially fitted conference rooms to "pretty much our standard way of doing business," according to Donald Augustine, division leader of technical computing at the aerospace firm's Information Systems Company.

Users now routinely set up videoconferencing meetings in order to work out design and management decisions or resolve problems. Videoconferencing systems have boosted productivity and saved the cost of flying everyone out to one place, Augustine said. "You can have meetings quicker and usually get all the right people present at both ends, so you can arrive at better decisions more rapidly; so it's worth money."

In addition to setting up videoconferencing meetings among its own sites, McDonnell Douglas "does a significant amount of business" over such links, talking with suppliers and customers and teaming other aerospace companies on major contracts, Augustine said.

Until recently — when the firm began to extend its videoconferencing capabilities to more and smaller sites — McDonnell Douglas had implemented about 10 "full-function, fairly high-resolution videoconferencing systems," primarily provided by Compression Labs, Inc. (CLI).

While the price tag for such products has been dropping steadily over the past few years, high-resolution systems such as CLI's still require major outlay, which includes $100,000 or more for the coder/decoder (codec) equipment itself, plus dedicated high-speed connections to support 500K or 1M bit/sec.

As a result, McDonnell Douglas' current installation of such systems is limited to 10 or 11 fully fitted conference rooms at all major corporate sites across the U.S., Augustine said. About a year ago, however, the company began implementing lower resolution videoconferencing systems from Picturetel, Inc. that address the company's need to provide the technology to a larger number of sites corporatewide.

Picturetel's systems cost only $25,000 to $30,000 and can be linked over dedicated or switched 56K or 112K bit/sec. links. This permits McDonnell Douglas to set up videoconferencing links much more quickly and cost-justify them at far more sites, Augustine said.

McDonnell Douglas' Augustine

McDonnell Douglas currently has about a dozen Picturetel systems implemented and expects to have approximately twice that number by year's end, Augustine said. However, the products' resolution level, which is comparable to that of a standard television screen, cannot transmit printed or written working documents so that they are readable at the other end, Augustine said.

In addition, the system may not be able to provide as clear a transmission of full-motion or large groups of people as a high-resolution system, he said.

McDonnell Douglas is awaiting two expected events in videoconferencing: another major price drop in high-resolution systems and vendor support, expected next year, of a CCITT standard that will allow different brands of systems to communicate. Right now, the only way to hook a Picturetel system to a CLI system is to put codecs back to back, he added.

A future application plan at McDonnell Douglas is to hook up videoconferencing systems directly to engineering graphics workstations, Augustine said. "That's still at the investigative stage," he said.

TCP/IP

CONTINUED FROM PAGE 51

take a hit on performance."

In announcing TCP/IP support, IBM officials said again that they plan to add native Ethernet to the AS/400. They did not give a date for this event.

In another connectivity item in the AS/400 operating system, IBM said OS/400 Release 2 will be able to support iconic interfaces through intelligent workstations attached to an AS/400.

In May, IBM announced Easel, an iconic interface for 370 environments developed for the company by Interactive Images, Inc. in Woburn, Mass.

"IBM was absolutely startled by the demand [for Easel] from users," observed Aberdeen Group analyst John Logan. "They hit a real hot button, and now they're packaging it for the AS/400."

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But it's not the only reason. Because the 432 is, after all, from Amdek. A company with over 12 years experience in the computer monitor business, and the leading independent monochrome supplier.*

The 432's 14" etched-surface, flat screen produces hardly any glare or distortion. And far less eyestrain than Big Blue's PS/2 monitor with its smaller, 12" curved screen.

What's more, IBM's smaller screen also carries a bigger price tag.

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Wollongong TCP/IP plans shift to desktop

BY JOANIE M. WEXLER
CW STAFF

Wollongong Group, Inc. extended its Transmission Control Protocol/Internet Protocol networking strategy to the desktop last week, announcing products that are said to allow popular local-area networking software and workstations to hook up as clients to a variety of minicomputers and LAN servers.

The company, in a Networld '89 announcement, introduced its Pathway family of products, which allow basic file and printer sharing among dissimilar systems via TCP/IP.

Pathway is intended to give desktop computer users access to resources across the corporate network. Wollongong's new software allows "the same DOS machine to access a Netware server or a DEC server via TCP/IP," said David Langlais, Wollongong's director of corporate development for Pathway.

Pathway is said to allow TCP/IP-based connectivity to the following servers:

- Unix and Microsoft Corp. OS/2 systems that support Microsoft's LAN Manager.
- Unix systems supporting Server Message Block (SMB).
- Digital Equipment Corp. VMS systems supporting SMB.
- Unix and, in November, OS/2 systems supporting Sun Microsystems, Inc.'s Network File System (NFS).

Pathway is said to support the following workstation environments:

- Apple Computer, Inc. Macintoshes on Appletalk or Ethernet.
- MS-DOS systems running IBM Netbios.
- MS-DOS systems running NFS.

Pathway incorporates the company's WINS TCP/IP products, which can be converted to Open Systems Interconnect standards. According to Langlais, Pathway will be network-manageable "in a short period of time."

While Pathway may not be the answer to all the interoperability needs of the desktop user, it does provide a basic utility that users are seeking: a file system that addresses inconsistencies in operating systems. "Users have data in VMS, and they want to get it into an Excel spreadsheet. Pathway does this as a consistent implementation over several platforms using a common protocol. That is better than using different Stone Age utilities for each connection," said analyst Mary Modahl at Forrester Research, Inc., a Cambridge, Mass., market research firm.

She added, however, that Pathway serves only as a foundation for more sophisticated functions such as graphical interfaces.

Networld

CONTINUED FROM PAGE 51

14,000 packet/sec. Typical bridge throughput is 3,000 packet/sec. Available immediately, the 13000 starts at $2,900.

Andrew Corp. announced Bridgeport/7414, a Token-Ring-to-Token-Ring bridge.

BICC Data Networks, Inc. announced Isolan 1410, an Ethernet-to-Ethernet, LAN-to-LAN bridge. It costs $12,600 per pair.

While the remote bridge-router market is taking off (see chart), smaller vendors such as BICC, Andrew and RAD could have a tough time carving share from Vitalink Communications Corp. in the Ethernet segment and IBM in the Token-Ring arena, according to a recent Forrester report.

Vitalink, said to have 75% of the Ethernet bridge market, has Digital Equipment Corp. as a reseller.

During the second phase of LAN interconnectivity, which will occur in 1992 and 1993, users will start demanding network management features, support of the Open Systems Interconnect standard, fiber-optic backbone links and Token-Ring-to-Ethernet connections, Forrester predicted.

Network management and diagnostic tools announced at the show included the following:

- An 802.3 Ethernet version of Vance Systems, Inc.'s ATS 1000 LAN test and analysis system. Priced from $19,500, the product is said to capture traffic events and monitor performance in real time, decode protocols and perform configuration management.
- Standard Microsystems Corp. announced what is said to be the first automated system for detecting, isolating and disconnecting problem nodes on an Arcnet LAN.
- Accunetics, Inc. introduced NMS 1000 Network Management Systems, said to identify and diagnose LAN problems, as well as analyze network throughput, signal quality and node-pair activity. The first version supports Arcnet, while Ethernet and Token-Ring versions are scheduled for availability in the third and fourth quarters of next year. Pricing is $995 for software and $2,495 for hardware.
- Tiara Computer Systems, Inc. announced Network Inspector, a software-based network monitoring and diagnostic system. Priced at $1,295, an Ethernet version is scheduled for October availability, with Arcnet and Token-Ring versions to follow.

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Richardson

CONTINUED FROM PAGE 51

and communications system.

The user interface issue has become moot, thanks to pledges of support for Motif. Motif has been available for only a short time, however, and there is a paucity of applications. The API will be a mix of proprietary — that is, VAX/VMS — and public standards, or Posix. The same is true for communications.

The database management system is the most crucial component for integration. This is where the role of the "fourth parties" — developers who have written applications on top of the third-party products — comes into prominence. Sun Microsystems, for example, pursues value-added resellers that have written applications for DBMS from firms such as Oracle, Ingres, Sybase and Informix rather than stand-alone software vendors. The company believes this moves users closer to application integration.

Users' emphasis on preserving the software investment has led vendors to commit to "silicon independence." DEC, IBM, HP and Sun are all moving to provide a common environment across their multiple hardware lines.

The AAE concept is in concert with the user's preference for a primary site-integration platform. According to our surveys, more than 65% of Fortune 500 users plan to standardize on a primary vendor, generally DEC, HP or IBM.

Most users are only starting to define their core AAE. In the next 24 months, they will begin to require that all software purchased or developed internally must conform to it. The advantage they will see immediately will be easier and less expensive systems integration.

The not-so-good news will fall on the second-tier computer vendors that are unable to line up a wide range of applications support and on some integrators whose primary role has been to tie together disparate systems.

Stage Two defines industry-specific architectures, which typically integrate vertically oriented software packages with an AAE platform. If the early work of DEC and IBM is any indication, we expect many users to implement the first two stages concurrently.

DEC has teamed with a number of software vendors to develop an AAE specifically for the Aerospace/Department of Defense market. This grew out of a project at the Honeywell Space and Strategic Avionics Division in Clearwater, Fla. DEC worked with Consilium (shop-floor control software), Palette Systems (text and graphics software) and Cimtelligence (computer-aided process planning) to provide a paperless, integrated shop-floor management system.

The "Clearwater solution" has been implemented at dozens of customer sites and was a key factor in Boeing's selection of DEC to be the prime IS integrator at its new $235 million sheet metal plant.

IBM has targeted repetitive-process users — food and beverage, pharmaceuticals, chemical and consumer goods companies — and has teamed with Incode to develop POMS, or Process Operations Management System software. The two companies have formed a consortium with five Fortune 100 process manufacturers to link planning and manufacturing resource planning to process control and operations [CW, July 10].

AMR believes the deployment of industry-specific platforms may be the most significant — and ominous — trend in computer-integrated manufacturing (CIM) today — ominous, because users and third-party software firms could commit to platforms from IBM and DEC, virtually shutting out second-tier providers.

Software vendors that have already committed to developing interfaces to POMS have a vested interest in its success and have taken on the role of evangelist for the concept.

Meanwhile, the Unix market needs a leader and a leading architecture. While HP has developed its own architectures for its six key target markets, most of the focus has been on the HP 3000, its non-Unix minicomputer. HP's Industrial Precision Tools, coupled with New Wave, provide a strong core solution. Someone needs to rally the Unix software vendors to keep DEC and IBM at bay.

In Stage Three, users build on earlier platform work to develop an information architecture unique to their company. For example, they may wish to extend an industry-specific architecture to provide unique reporting capabilities or meet internal company-compliance requirements. This will be an ongoing, iterative process.

The move to standard architectures is in concert with users' desires to concentrate on building products. It should simplify the integration aspects of CIM.

Richardson is vice-president of research at Advanced Manufacturing Research in Cambridge, Mass.

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NEW PRODUCTS

Local-area networking hardware

Legato Systems, Inc. has announced a network file system accelerator for Sun Microsystems, Inc. servers.

Prestoserve is a combination hardware and software product that reportedly reduces network server overhead and speeds network file-serving functions. It is said to consist of a software tape, a Motorola, Inc. VMEbus board, a battery backup system and documentation.

Available in production quantities, the price is $7,995.

Legato Systems
260 Sheridan Ave.
Palo Alto, Calif. 94306
415-329-7880

An IBM Personal Computer AT-compatible file server featuring an Intel Corp. 80386 CPU running at 20 MHz has been introduced by Goldstar Technology.

The GS320 reportedly comes with 1M byte of random-access memory, expandable to 2M bytes on board, or 10M bytes of high-speed memory with an optional RAM board.

According to Goldstar, the computer has one 5¼-in. 1.2M-byte floppy drive, serial and parallel ports, space for three half-height drives, eight expansion slots and a real-time clock with battery backup. Measuring 6.1 by 18.5 by 16 in., the system sells for $3,195.

Goldstar Technology
1130 East Arques Ave.
Sunnyvale, Calif. 94086
408-737-8575

Laptop computers can directly access Ethernet using an external adapter introduced by Xircom, Inc.

The Xircom Pocket Ethernet Adapter plugs into a parallel port on an IBM Personal Computer or compatible and connects to Ethernet cabling at its other end. The 5- by 2- by .85-in. adapter is said to come in two models to accommodate various Ethernet versions. The adapter, including certified driver software for Novell, Inc. Netware, sells for $695.

Xircom
Suite 114
22231 Mulholland Highway
Woodland Hills, Calif. 91364
818-884-8755

Local-area networking software

Tecmar, Inc. has upgraded its line of tape subsystems with an enhanced version of its QTOS software.

QTOS Version 1.12 offers improved network support, data interchange between Apple Computer, Inc. computers and IBM Personal Computers. QTOS features the ability to back up Apple server partitions under Novell, Inc. Netware 2.15 from a DOS workstation without conversion. For current users, QTOS 1.12 is available as a free upgrade through Tecmar's Bulletin Board system. For $25, a diskette and manual can be purchased.

Tecmar
6225 Cochran Road
Solon, Ohio 44139-3377
216-349-0600

Powercore, Inc. has introduced a series of security tools for its Network Schedular group calendar for local-area networks.

The security program is included in all Network Schedular software packages starting with Version 5.0 and is said to enable an administrator to establish and maintain a list of authorized users for the scheduler.

According to Powercore, each authorized user is given levels of access for viewing and modifying appointments and allowing companies to establish calendars that range from wide-open bulletin boards to ones with absolute privacy.

Network versions of Network Schedular are priced starting at $495 for eight users. An upgrade procedure for users of Version 4.0 and above is available, Powercore said.

Powercore
P.O. Box 756
One Diversatech Drive
Manteno, Ill. 60950-0756
815-468-3737

Links

Mitek Systems Corp. has announced connectivity software products for the IBM System/38 and Application System/400.

The Openconnect products connect IBM midrange and mainframe systems to Transmission Control Protocol/Internet Protocol (TCP/IP) hosts on an Ethernet network. Openconnect Telnet Client Full Screen allows an IBM 3270 or 5250 terminal connected to an IBM midrange system to have full-screen access to Digital Equipment Corp. VT100 applications on a TCP/IP network.

The second product, Openconnect FTP Server, gives users on a TCP/IP host the ability to use their resident File Transfer Protocol process to access an IBM midrange host.

Prices for Telnet Client Full Screen range from $2,000 to $7,500; the FTP Server is priced from $1,100 to $2,800.

Mitek Systems
2033 Chennault Drive
Carrollton, Texas 75006
214-490-4090

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MANAGER'S JOURNAL

EXECUTIVE TRACK

Larry H. Moles has joined **Coast Savings and Loan Association** in Los Angeles as executive vice-president and chief information officer.

Moles, 54, is responsible for the overall data processing operations of the company, a division of Coast Savings Financial, Inc. that specializes in residential real estate lending and retail banking.

Moles joins Coast from Downey Savings and Loan Association, where he managed DP operations as an outside consultant.

Before that, Moles was a senior advisor at Systematics, Inc., a vendor of processing services and software for the banking and savings and loan industries.

He has also held IS management positions at Butterfield Savings and Loan in Santa Ana, Calif., and Fidelity Federal Savings and Loan in Glendale, Calif.

....

Bob Hofmann has been named data processing manager at **Nashville Wire Products, Inc.** in Nashville.

A native of Austria, Hofmann has 17 years of IS-related experience, including a position as computer operator for the financial secretary of the Austrian government.

He did postgraduate work at Purdue University and holds a master's degree in education administration from the University of Tennessee at Martin.

Hofmann lives with his wife and daughter in White Bluff, Tenn.

....

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

Avon's Perry: Not just lip service

IS chief has made more than cosmetic changes with his emphasis on systems response

BY ROBERT MORAN
CW STAFF

When Avon calls, information services answers. Raymond Perry, Avon Products, Inc.'s corporate vice-president of information systems, makes sure it does so with service.

"IS stands for impact and service," Perry says, "but you earn the right to deliver an impact by delivering superior service."

The 51-year-old mechanical engineer, who was educated at Cornell University and garnered experience at Mobil Oil Corp., Xerox Corp. and the former Burroughs Corp., made his own impact on the then-batch-oriented Avon when he came on board in November 1986.

Originally hired as vice-president for IS in the direct-selling group, the company's largest business unit, Perry was promoted to his present position in 1988.

The self-styled technological conservative upgraded Avon's manufacturing, marketing and payroll systems, embraced imaging systems and installed an integrated T1 voice and data network. "There are more systems that are now on line," Perry says, "but I don't think that there is a need for Avon to be a risk-taker in terms of technology."

To Perry, IS service means just that — not lip service. He requires senior department personnel to be on-call around the clock, every day of the year. Carrying beepers, they fight against Perry's imperative: "If any production system is down for more than four hours, I have to be notified. Whether night, day or the weekend, I am always available. International centers have a 24-hour rule."

PROFILE: Raymond Perry

JOYCE RAVID

Position: *Corporate vice-president of IS, Avon Products, Inc.*

Mission: *To provide consistently high levels of service to end users while improving business efficiency with T1, imaging and other technologies*

And he means it, according to his boss, Executive Vice-President of Business Development and Planning Robert Pratt, who recalls an early testing of Perry's mandate. "Some problems were left on Friday afternoon for Monday," Pratt says. "Ray made it very clear that he meant 24 hours a day, seven days a week."

Pratt characterizes Perry as a thorough professional whose blend of basic experience and managerial expertise has earned him respect within the ever-changing Avon. "Quite a bit has changed in information services since Ray's presence there, both in terms of the ouput of the department and the way the department interacts with the clients," Pratt says.

In addition to fighting technological battles, Perry has had to work of late in the face of an attempted hostile takeover of Avon by financier Irwin Ja-

Continued on page 66

Sneaking research dollars past Finance

BY CLINTON WILDER
CW STAFF

Say you've just returned from a conference on leading-edge technologies, and your head is brimming with the possibilities of neural networks, reusable code-generating tools and integrated voice/data/video terminals. You would love to have some of your best technologists try out some of these things, but how on earth will you find the approved funding for them?

Hide it.

That Swiftean "modest proposal" comes from Charles P. Schneider, executive vice-president of Management Dynamics, a Tarrytown, N.Y.-based information systems management consultancy. Schneider believes that just as war may be too important to leave to the generals, research into potential new strategic technologies is too important to be left to the bean counters.

So, Schneider urges information systems executives to set aside 2% to 5% of their total IS budget — or more, in some cases — for technology experimentation. He jokingly refers to the idea as a "slush fund," but the intent is very serious — to free up a few purse strings from the usual bonds of cost-benefit analysis and return on investment.

"Not enough of that type of experimentation takes place in IS," Schneider says. "Resources tend to go right to specific projects. That's why it takes so long for new applications to surface in areas beyond the traditional ones."

The technology slush fund points at a larger issue, Schneider believes: the development of a corporate culture — including, but not limited to, IS — that encourages innovation and tolerates failure. "There has to be a willingness to not expect each thing to be a success," he says.

The fund should essentially be considered research and development within IS, analogous to the corporate R&D budget for new product development. "To assume there's no need for research within IS assumes that you're already doing it as efficiently as possible," he says. "I doubt there's a company out there that can make that statement."

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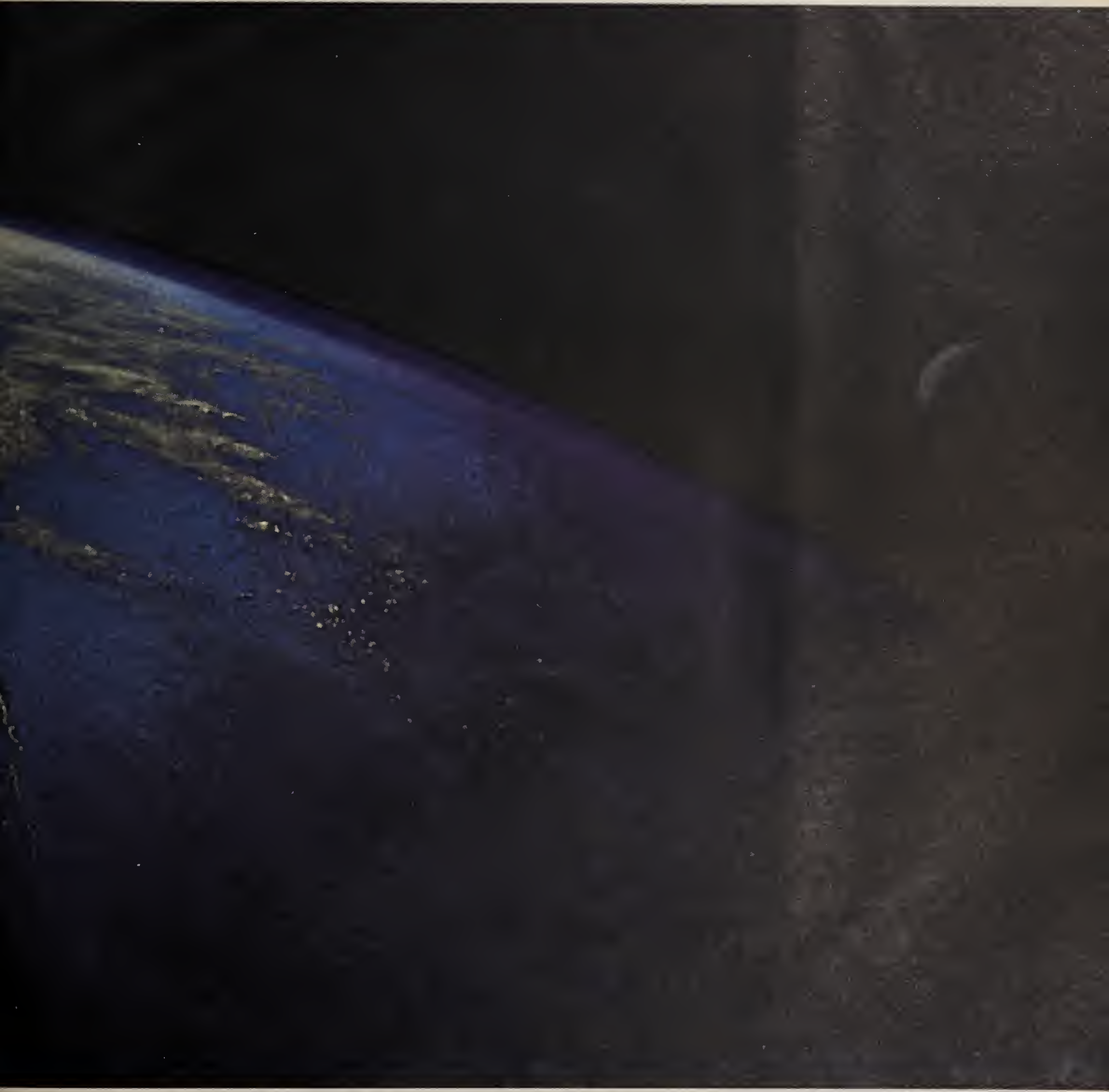

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BOOK REVIEW

A Macintosh high priest takes a big bite out of Apple

THE MACINTOSH WAY
By Guy Kawasaki
Scott, Foresman & Co., $19.95

Anyone who has ever visited a park or beach crawling with canines quickly stumbles upon a simple genetic truth: Dog owners often bear a frightening resemblance to their shaggy sidekicks. After finishing Guy Kawasaki's *The Macintosh Way*, it may be about time to extend that corollary to computer owners.

In *The Macintosh Way*, Kawasaki lets the good times roll with a book that is as user-friendly, simple and elegant as the machine from whence it derives. The inception of Apple Computer, Inc.'s Mac is treated like a firefly in a jar, with Kawasaki carefully poking and prodding it to see what made it glow. In the process, he crafts an entertaining and thoroughly irreverent guide to modern business success that is guaranteed to spark the entrepreneur in all of us.

Kawasaki served as a software evangelist at Apple for more than three years, boiled water during the birth of the Mac and, like many present during those formative years who have written about it, stumbled upon more personal insights and life truths than any Dalai Lama could hope to provide.

Not just tootin'

But *The Macintosh Way* is much more than a boastful retrospective. Although the Apple success story has reached the status of Norse legend in the computer industry — and Kawasaki is justifiably proud of his contributions — he sweeps away much of the myth.

The creation of the Mac, Kawasaki writes, was nothing more than how one person — namely, Steve Jobs — got disgusted with mediocrity, drove his staff to the borders of lunacy in his quest for perfection and achieved an extraordinary level of success.

Despite the wondrous picture that the media has painted of the Mac's birth, there is no mention here of divine intervention or Jobs' birth in a manger. It all emanated from hard work supporting a well-conceived idea.

A few of the essentials are a deep product (i.e., one that appeals to both captain and crew); 90-hour workweeks; the right office environment ($10,000 speakers and a compact disc player help); a top-notch support staff; and an intelligent marketing campaign. In addition, throw in a few splashy T-shirts to advertise your product.

Kawasaki has spent a lot of time in the computer business. He now heads up software developer Acius, Inc., and he has made his share of friends and enemies along the way. Consequently, he seasons *The Macintosh Way* liberally with acerbic but often deadly accurate observations.

Be forewarned: When the man is fired up, he wields a mean Wordperfect. Among the institutions he hits are Esther Dyson's computer conferences ("where computer industry people pay $1,000 to listen to other computer industry people brag about how smart they are,") marketing euphemisms ("a bug is an imperfection in your competitor's program . . . with Apple it's an undocumented feature,") and strategic alliances ("getting someone to announce that they are going to do what you know you would lose money doing").

In some instances, Kawasaki's digs border on the vicious. It would be unfair to say that Kawasaki has a chip on his shoulder concerning Ashton-Tate President Ed Esber; it's more like a dinette set. While it is immediately clear that he in no way considers Esber to be a mercantile prophet, Kawasaki has never forgiven Esber for trying to shoehorn in on Apple's success. Consequently, he proceeds to kick Esber in the database throughout the book's 200 pages.

The flip side

Conversely, Kawasaki has a soft spot for user groups and chief executive officers who attend their meetings as well as company presidents who man their own booths at trade shows.

One thing he neglects to mention, however, the fine art of logrolling, which is graphically highlighted on the back cover where — gosh, what a coincidence — the same people giving rave reviews of the book are those of whom he speaks glowingly within.

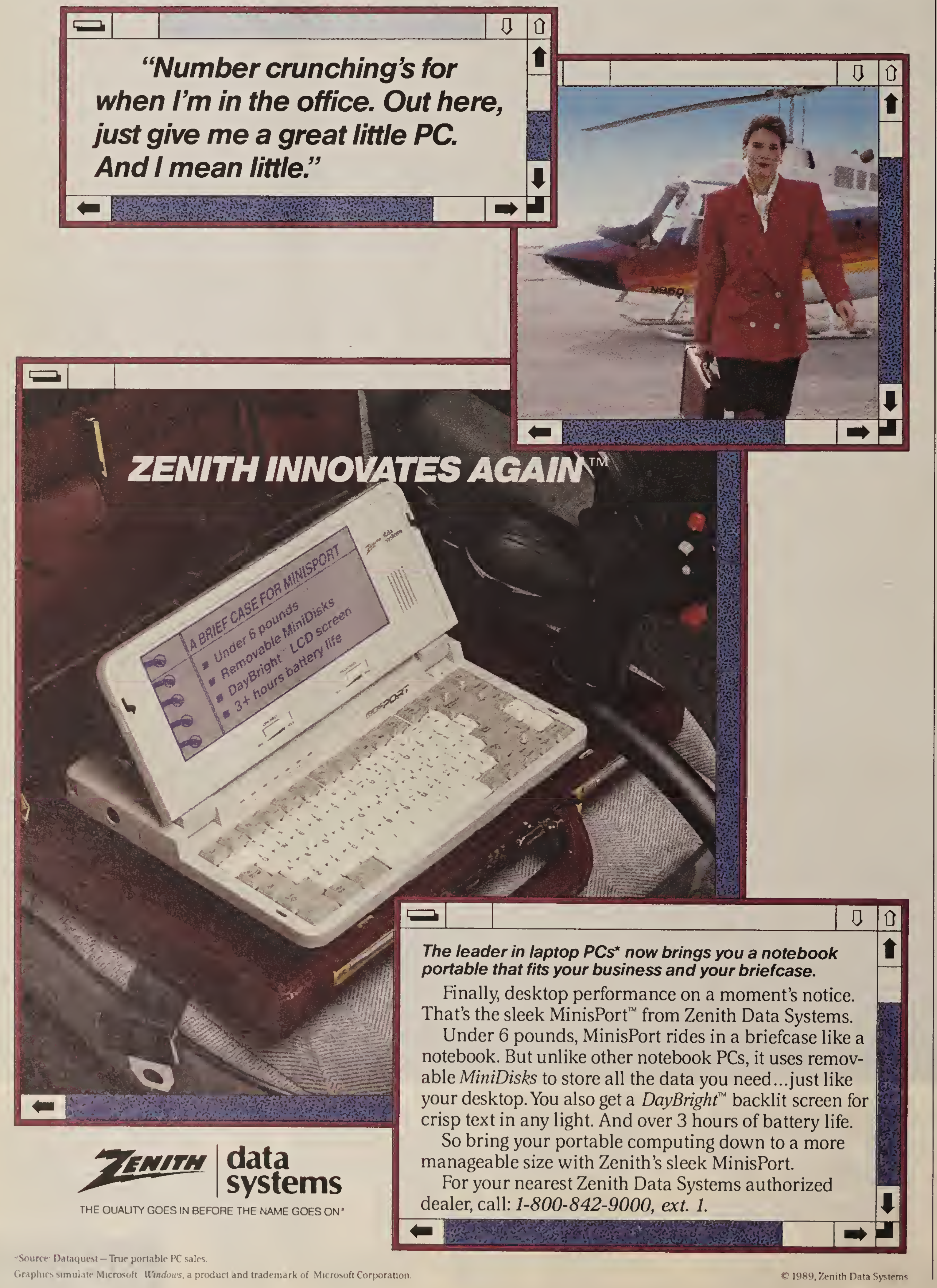
But all is not business gymnastics. Kawasaki also takes on that awful void between turning the PC off at night and returning the next morning — in short, your social life. With a few of Kawasaki's tips tucked into your leisure suit ("treat your date like she is the only platform in the world") you'll be more popular than beer at a ball game.

Early in the book, Kawasaki offers an observation by General "Vinegar Joe" Stilwell: "The higher a monkey climbs, the more you can see of his behind." In the business world, few words ring truer.

But if you use *The Macintosh Way* to cover your southern exposure, it will be easier to shimmy up that tree more quickly.

JAMES DALY

Daly is a *Computerworld* West Coast correspondent.



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Perry

CONTINUED FROM PAGE 61

cobs and Amway Corp. Employee anxiety, compounded by the existence of substantial outside opportunity in what Perry regards as a high-turnover field, has increased Perry's face-to-face contact with the 455 employees in his department, especially the 235 based at the Rye, N.Y., information systems center at which Perry works. "We have done what we can do to overcommunicate with employees, and they know as much as anyone about what is taking place," he says.

Those who work for Perry say his previous experience as a teacher shows through in his relationships with employees. While at Burroughs, Perry taught an introductory course in information systems to MBA students at the University of Michigan.

"Ray has the ability to elevate workers' knowledge and make them feel as if they already knew more than they thought they did," says Stu Bennel, an IS director who has worked with Perry for three years.

Although Perry calls himself a technology conservative, Avon has forged ahead in imaging technology. Imaging is at the heart of the company's distribution system, which processes 50,000 orders each day from its five marketing and distribution facilities across the U.S.

Scanners read purchase orders sent every two weeks from 475,000 U.S. sales representatives. That information is fed into warehouse-management and assembly-control systems that are based on Digital Equipment Corp. computers. Orders received in the morning are shipped and billed by sundown.

The firm is expanding its imaging platforms, but Perry declines to offer specifics. "The automated equipment is usually more accurate than humans, and that alone almost pays for itself," he says. "As you get things more accurate, you get orders out faster, and you provide better service."

The repeated word and concern at Avon's IS is service. It ranges from such ostensibly small-scale offerings as one-hour response time on a personal computer Help desk to the more dramatic installation of IDNX, IBM's version of Integrated Services Digital Network. The Rye center even has a robotic mail cart called Ralph, which cruises along a magnetic strip beneath the corporate carpet making deliveries throughout the day.

Network payoff

Driven by cost savings, future growth, improved service levels and a desire to provide on-line support to manufacturing centers, the company installed a fully integrated T1 voice and data network that carries all traffic for the eight Avon data centers in the U.S. and Canada.

Installed in early 1988, the network, now worldwide, "paid for itself in about five months, doubled the capacity and just about doubled service levels," Perry says.

Although there is little dependence on information from one country to the next, the centers have common billing and order-processing applications, which are developed in centers of expertise and exchanged with other centers. According to Perry, the procedure lowers development and maintenance cost and, over time, has saved the company from having to hire about 100 employees.

Perry and his wife are avid sailors who belong to several yacht clubs. They have two children — one a school teacher and the other an employee at Xerox Corp. Perry pays more than lip service to the importance of family, too: Of all that he has achieved at Avon, he regards an employee day-care center as his biggest achievement.

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Avon ceases animal testing

With the aid of database technology, Avon has stopped the controversial testing of its products on live animals.

Earlier this year, the company announced it would no longer test its products for toxicity reactions on animals.

According to Avon, 95% of its product submissions required no animal testing and were judged safe based on comparisons of known formulas and toxicity data that was collected in the past 15 years in its proprietary database. But the remaining 5%, based at least in part on new raw materials, was tested on animals until this year, a practice deemed cruel by many.

That 5% was composed of raw materials that were not similar enough to other materials contained in the database, says Mike Dickens, Avon's manager of toxicology in Suffern, N.Y.

But an updated database now contains 4,000 raw ingredients, including toxicity information on products approved by the U.S. Food and Drug Administration and supplier-provided information about materials that have not been approved. Via terminals, chemists and toxicology evaluation personnel access the proprietary database, which runs on an IBM 3083 mainframe under IMS.

"We piloted a program to determine where alternatives, such as literature and supplier information on the safety of new raw ingredients, would allow us to make the decision," Dickens says. The database, which is highly secured, narrows down the unknown quantities about new raw materials and permits laboratory personnel to judge the safety of the products.

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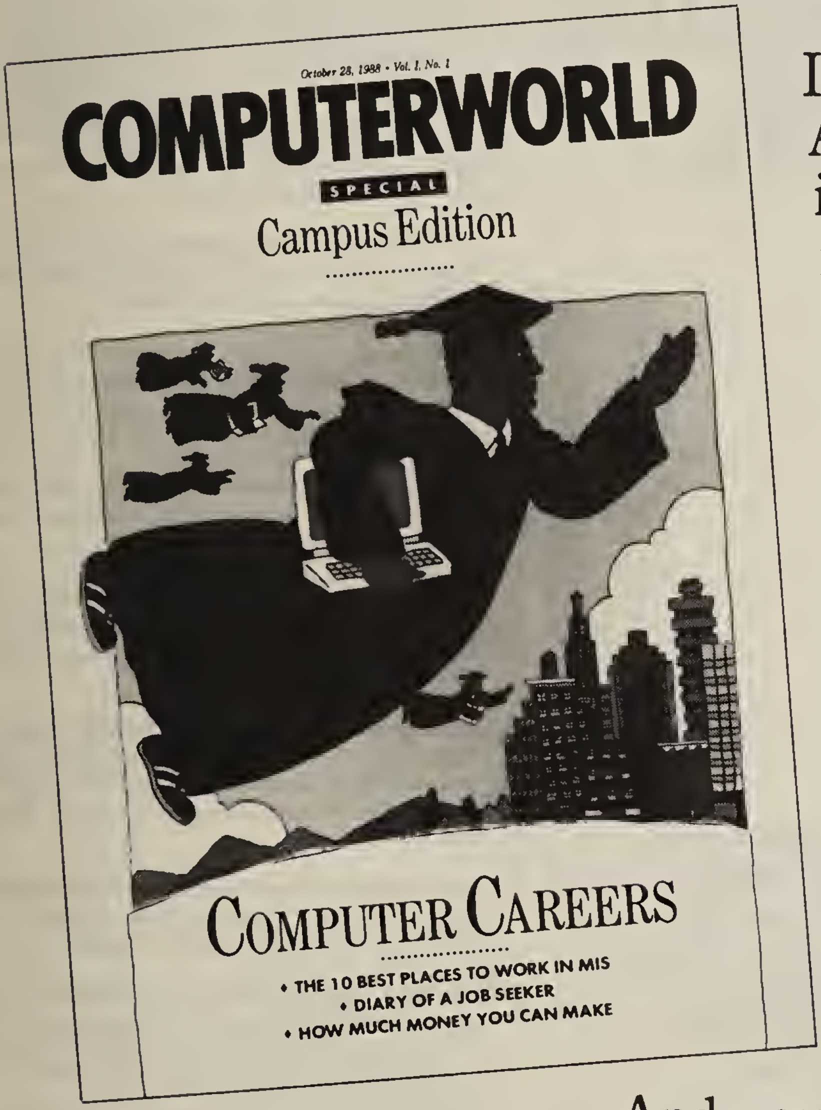
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- MIS salary and job satisfaction survey
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- The MIS career ladder
- Profiles of acclaimed top level MIS executives
- The strategic advantage of computers and how they play a key role in running a company

CALENDAR

"Applying information technology to sales and marketing for competitive advantage in the 1990s" will be the topic of the Fourth Annual Strategic Issues Conference sponsored by Decision Support Technology, Inc.

The conference, to be held Oct. 30 - Nov. 1 in Cambridge, Mass., will feature case examples of how major organizations are profiting from the strategic use of information technology in sales and marketing and will discuss state-of-the-art implementation strategies from industry practitioners.

Speakers are slated to include Thomas Malone from the MIT Sloan School of Management; James Zucco, vice-president of product development at MCI Communications Corp.; Steven Rubinow, director of decision-support services at the Quaker Oats Co.; Ed Mahler, artificial intelligence program manager at the Du Pont Co.; and Peter Lorange, professor of management at The Wharton School at the University of Pennsylvania.

For more information, contact Decision Support Technology, conference registration office, 51 Church St., Boston, Mass. 02116.

SEPT. 24-30

DMA's 72nd Annual Conference & Exhibition. Washington, D.C., Sept. 24-27 — Contact: Direct Marketing Association, 6 E. 43rd St., New York, N.Y. 10017.

International Development Center Fall Conference. San Francisco, September 24-27 — Contact: Development Center Institute, Inc., P.O. Box 44087, Indianapolis, Ind. 46244-0087.

Society for Information Management 1989 Annual Conference. Atlanta, September 24-28 — Contact: SIM Headquarters, 111 E. Wacker Drive, Suite 600, Chicago, Ill. 60601.

Telecon '89 — Opportunities & Challenges in Telecommunications. Toronto, Canada, September 24-28 — Contact: Canadian Business Telecommunications Alliance, 67 Yonge St., Suite 1102, Toronto, Ontario, Canada M5E 1J8.

Data Entry Management Association's XIIIth Annual Conference, Systems, Services & Equipment Exposition. Orlando, Fla., September 25-27 — Contact: DEMA, 101 Merritt 7 Corporate Park, Norwalk, Conn. 06851.

Exploring the Technology Spectrum. Anaheim, Calif., Sept. 25-29 — Contact: Common Headquarters, 111 East Wacker Drive, Suite 600, Chicago, Ill. 60601.

Implementing and Controlling Changes in Information Systems. Chicago, Sept. 25-26 — Contact: Institute for International Research, 331 Madison Ave., 6th Floor, New York, N.Y. 10017-5102.

Institute of Industrial Engineers Conference: Making Service Quality Work. Crystal City, Wash., September 25-26 — Contact: Institute Of Industrial Engineers, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

Industry/User Conference on Computer-Aided Acquisition and Logistics Support: Using CALS to Compete. Washington, D.C., September 25-26 — Contact: Kathy Stewart, Program Coordinator, CAD/CIM Alert, 1050 Commonwealth Ave., Boston, Mass. 02215.

Managerial and Team Building Skills for Project Managers. San Francisco, September 25-27 — Contact: Vern Lautner, 135 West 50th St., New York 10020.

Network Planning and Integration Seminar. New York, September 25-26 — Contact: Tucker Network Technologies, Inc., P.O. Box 429, Norwalk, Conn. 06854.

Design Engineering Show and Conference/West. Los Angeles, September 26-28 — Contact: Design/West, 999 Summer St., Stamford, Conn. 06905.

Diskcon Trade Show and Technical Conference. San Jose, Calif., September 26-27 — Contact: International Disk Equipment and Materials Association, 710 Lakeway, Suite 170, Sunnyvale, Calif. 94086.

Distributed Systems Conference. Santa Clara, Calif., September 26-28 — Contact: Dataquest, Inc., 1290 Ridder Park Drive, San Jose, Calif. 95131-9980.

Leveraged Leasing Symposium/Operating Lease Conference. Chicago, September 26-29 — Contact: Amembal & Isom, Lease Education & Consulting, 1406 South 1100 East, Salt Lake City, Utah 84105-2490.

Printed Circuit Board Expo '89. Minneapolis, Minn., September 26-28 — Contact: PMSI, 1790 Hembree Road, Alpharetta, Ga. 30201.

Two Sides of Systems Integration: Market Trends & Buyer Perspectives. Alexandria, Va., September 26 — Contact: International Data Corp., 5 Speen St., P.O. Box 955, Framingham, Mass. 01701.

C Programming with Style & Discipline Seminar. Milwaukee, September 27-29 — Contact: John Snedeker, program director, Center for Continuing Engineering Education, University of Wisconsin, 929 N. Sixth St., Milwaukee, Wis. 53203.

Eastern Region Government Technology Conference. Albany, N.Y., September 27-28 —Contact: GTC '89, P.O. Box 160288, Sacramento, Calif. 95816.

Implementing Software Improvement Programs' Working Group. Boston, Sept. 27-28 — Contact: Software Productivity Research, Inc., P.O. Box 1033, 1972 Massachusetts Ave., Cambridge, Mass. 02140.

Portable Computing Fall '89. New York, September 27-28 — Contact: IDG Conference Management Group, P.O. Box 9171, 20 Speen St., Framingham, Mass. 01701.

CASE Users Conference. Monterey, Calif., September 27-29 — Contact: CASE Research Corp., 155 108th Avenue Northeast, Suite 210, Bellevue, Wash. 98004.

Automation of Packaging Lines. Cincinnati, September 28-29 — Contact: Society of Manufacturing Engineers, One SME Drive, P.O. Box 930, Dearborn, Mich. 48121-0930.

NCGA Image Processing Briefing. Arlington, Va., September 28-29 — Contact: National Computer Graphics Association, 2722 Merrilee Drive, Suite 200, Fairfax, Va. 22031.

OCT. 1-4

Adapso's Management Conference. Orlando, Fla., October 1-4 — Contact: Frances Ianacone, Adapso, 1300 North Seventeeth St., Suite 300, Arlington, Va. 22209-3899.

Computer Services Seminar and Communications & Information Systems Seminar. Baltimore, October 1-4 — Contact: Rivka Hawk, Alex. Brown & Sons, 135 E. Baltimore St., Baltimore, Md. 21202.

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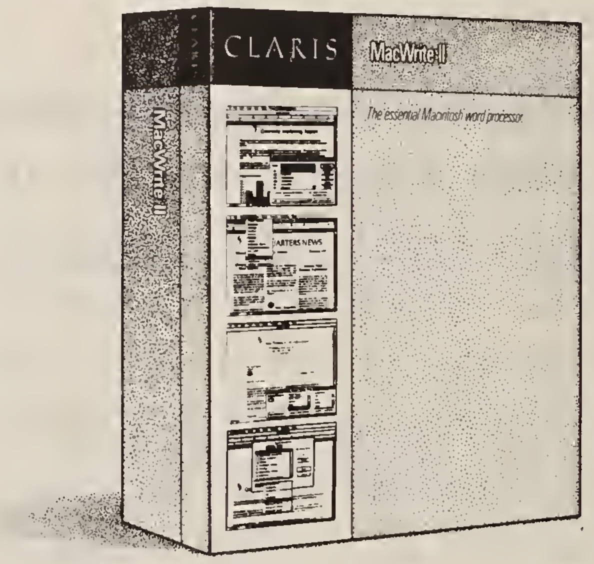

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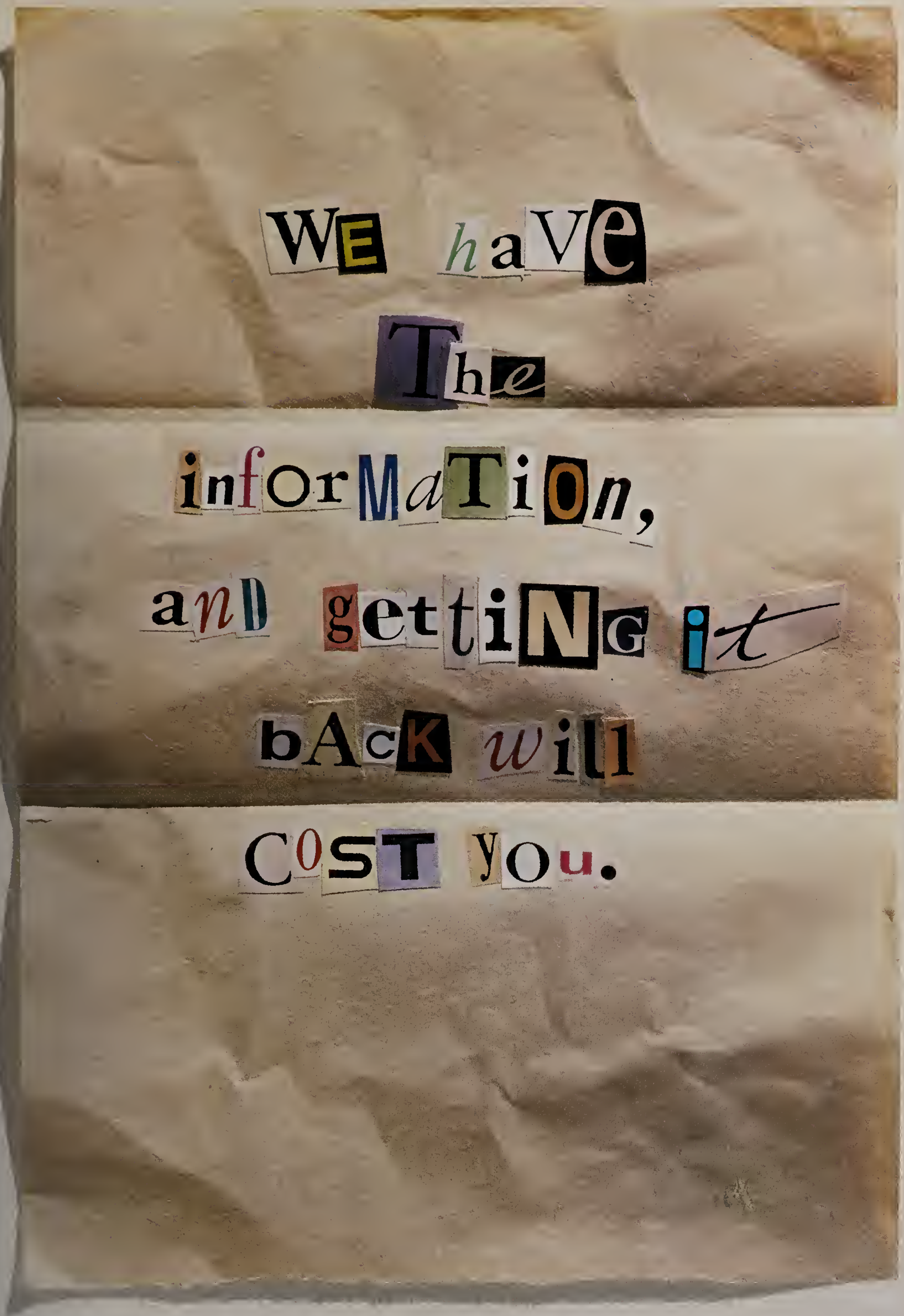

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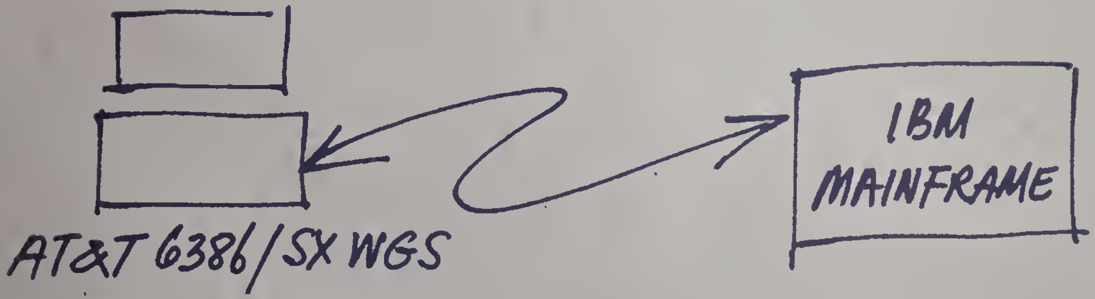

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Meet your other systems. Sharing information among people using different manufacturers' equipment has always been a problem.

Now the solution's as simple as the example in the first drawing above. A new AT&T 6386/SX Work-Group System links to an existing IBM® host and gives your people access to important corporate data held there.

The key lies in a network builder's oasis called the AT&T Application Operating Environment (AOE). AOE offers a unique collection of industry stan-

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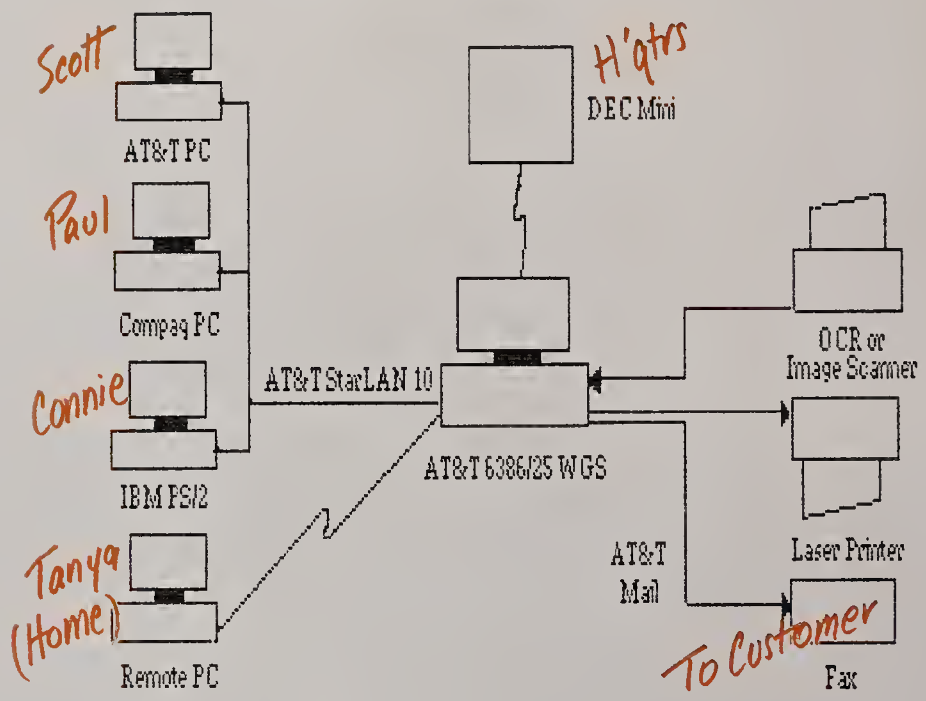

dards (SNA in this case) that let AT&T's new Networked Computers work smoothly with the systems you already have.

How to share new applications and precious resources. Take the case of Scott, Paul, Connie and Tanya in the second diagram. They each rely on expensive peripherals, but you can't afford to get them individual sets. And their complex, networked application would really strain your existing DOS server.

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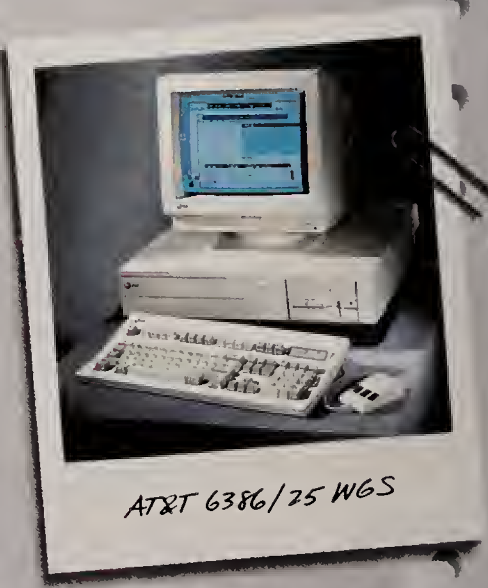
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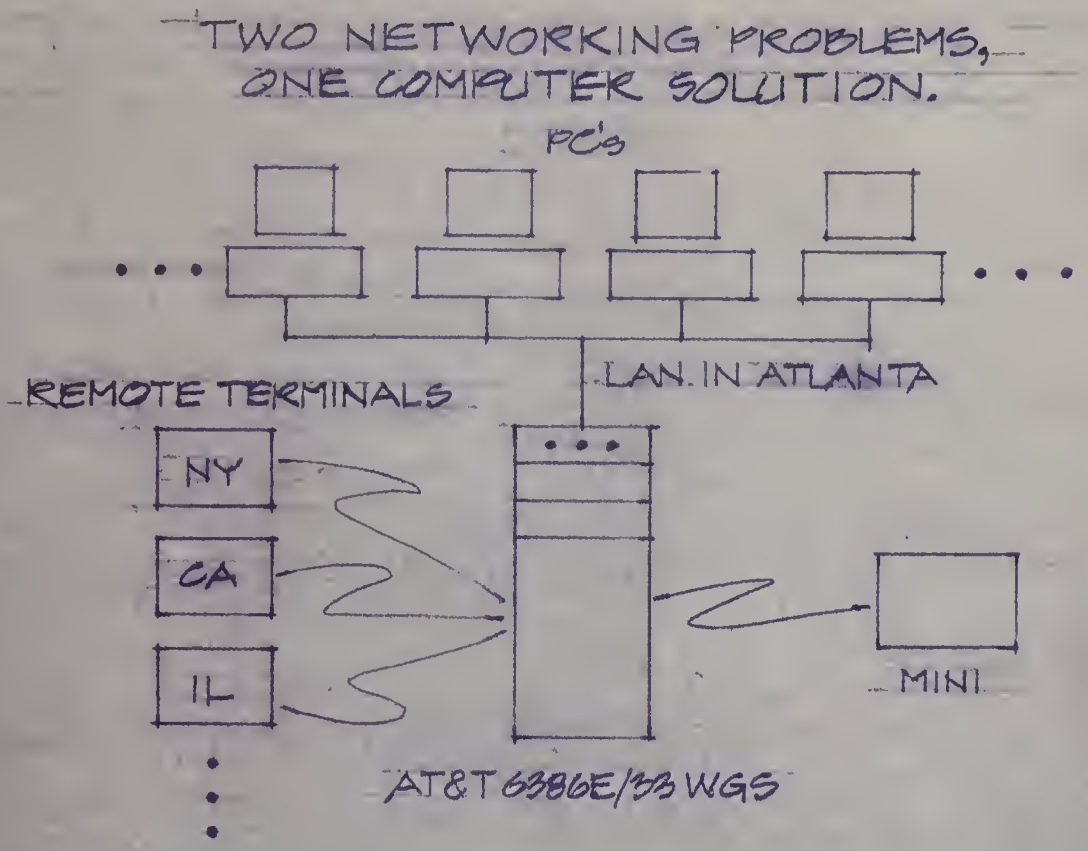

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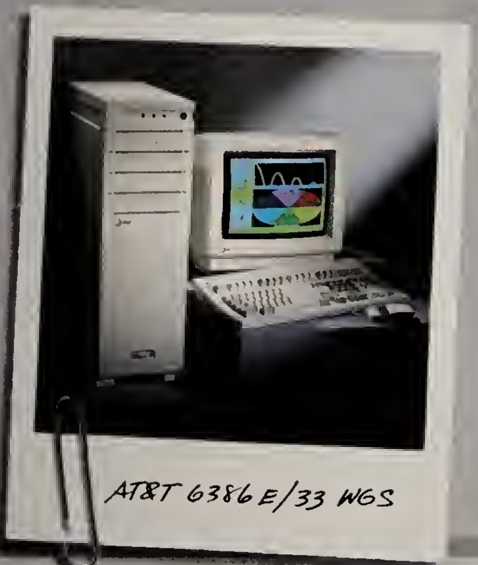
AT&T 6386 E/33 WGS

Now, shift into high gear by connecting the PC LAN you already have in Atlanta. We provide the systems and expertise you need to support LAN *and* remote terminal applications at the same time.

And for mission-critical Networked Computing, our solution is the AT&T 6386E/33 WGS Model S. It shines in networks like the one shown in the final diagram—where every bit

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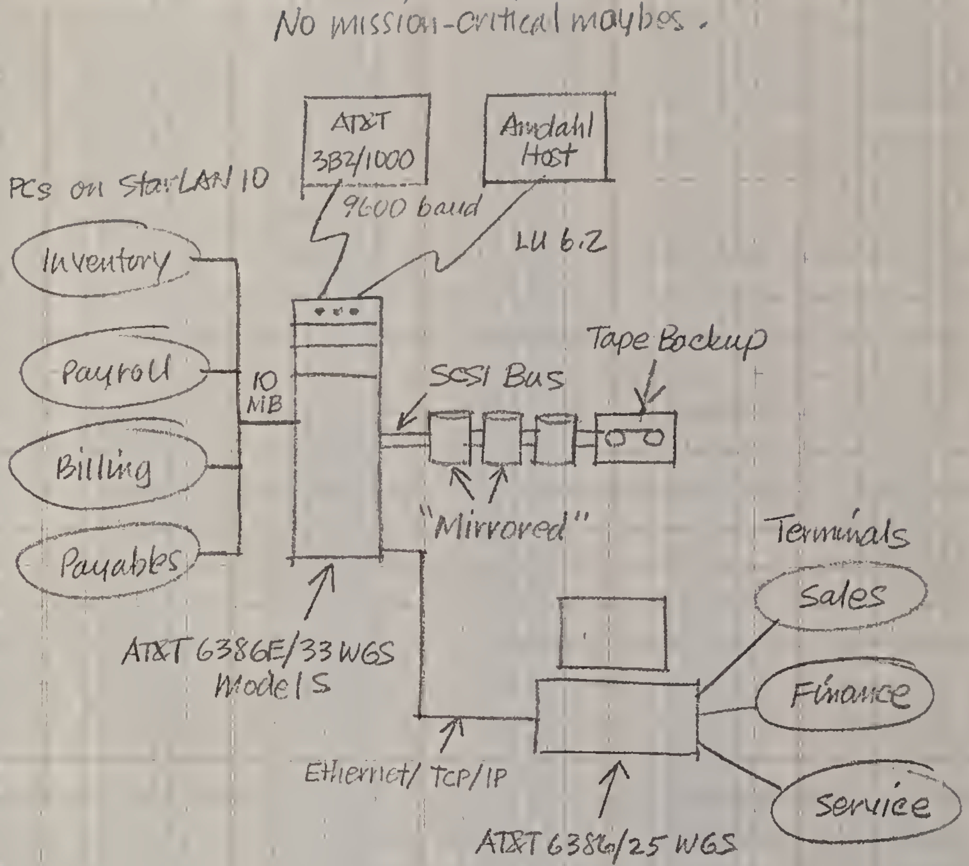

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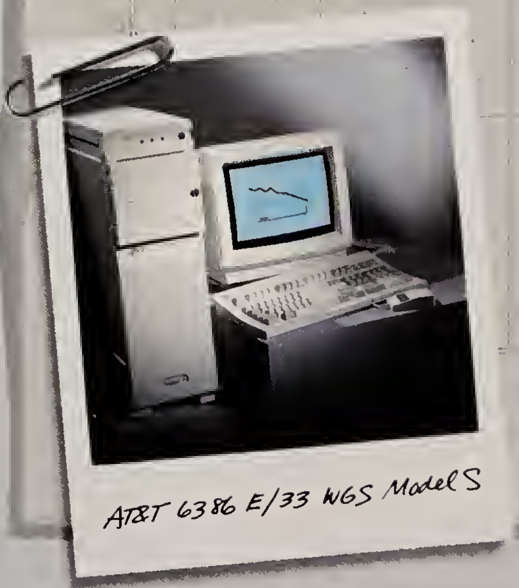
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HARDWARE ROUNDUP

LARGE AND MEDIUM-SCALE SYSTEMS

Few solid hits from regular lineup

BY ROSEMARY HAMILTON

When they write the history of large systems, what will stand out in the chapter for the past 12 months will not be IBM and the plug-compatible manufacturers (PCM). Instead, those who took the boldest steps came from outside the IBM market. While IBM and PCMs built on foundations laid the previous year, Unisys Corp. and Bull H. N. Information Systems, Inc. ushered in new mainframe generations.

In fact, what could turn out to be the year's biggest mainframe breakthrough has not yet arrived, and when it does, it will not be coming from any of the established players. The candidate for surprise company of the year is Digital Equipment Corp., which is expected to announce its first bona fide mainframe, the VAX 9000, in October.

Published reports claim the air-cooled DEC mainframe will be offered as a uniprocessor system in the 30 VAX units of performance range. The VAX 9000 is expected to offer typical mainframe features, such as enhanced system recovery with redundant power supplies.

Earlier this year, however, other traditional minicomputer vendors such as Data General Corp. and Prime Computer, Inc. stepped into the large-systems arena with mainframe-class systems of their own.

The DG entry came in late 1988, when it introduced its largest system ever. The MV/40000, which is scoring some hits in the installed base, can be configured into a 50 million instructions per second (MIPS) machine with four processors.

In late summer, Prime came out with its EXL 1200 series. Based on the Sequent Computer Systems, Inc. Unix-based processor, the EXL 1200 reportedly can be configured into a 120-MIPS machine. The company says it will support up to 1,000 users and is suited for large-scale database management and office automation applications.

RON CHAN

LARGE SYSTEMS

Although observers doubt that these systems will directly compete with the more established mainframe offerings, they are seen as important moves to hold on to installed bases.

"The impact on IBM's business will be marginal," according to Frank Gens, a vice-president at Framingham, Mass.-based International Data Corp.'s Financial Services Group. "The very high end for these mini vendors will serve as a growth path for their own installed bases."

Regardless of what moves vendors made, they all faced the same problem: an industrywide slowdown in demand.

"The vendors may have wanted to force change, but the customers wanted to move in an evolutionary way," points out Michael Geran, an analyst at Nikko Securities in New York. "Seduction doesn't work in the mainframe business."

The whole computer industry fell victim to a general slowdown in demand last year. "Capital spending in general has stalled, and MIS spending has slowed down as well," Gens says.

Holding their own

Although there has been no significant upswing yet this year, analysts say that most mainframe vendors either maintained their position or did slightly better than last year. IDC is predicting that the large-systems vendors group will ship approximately 60 units less in 1989 than it did in 1988, when 1,460 mainframes were shipped.

Donald Bellomy, an IDC analyst, says these shipment numbers show that mainframe vendors are holding their own. The slight drop is not enough to cause alarm, Bellomy maintains. Unlike midrange systems, mainframes still provide unique capabilities, such as huge database management systems and very high-performance transaction processing capabilities, which can keep them going, even if in a somewhat sluggish manner.

Some observers said the relative health of the mainframe industry supports the theory that users are moving to a two-tiered architecture that would greatly diminish the need for midrange systems. Their future picture includes very high-performance dedicated mainframes linked to scores of intelligent workstations.

"It grew in a very controlled way, but the key point is that the dinosaur isn't a dinosaur," Geran says. "The large-scale market was better than the minicomputer market. It's the big switch."

While the major players saw

INSIDE

Shining a Dull Image
RISC is helping vendors polish midsize systems. Page 79.

Death and Alimony
ETA's demise, a rift at Cray topped supercomputing news. Page 84.

Small, But Significant
Minisupers take a stab at expanding their niche. Page 85.

Hamilton is *Computerworld's* senior editor, systems.

Few solid hits

CONTINUED FROM PAGE 71

revenue gains, most have had better years in terms of profits. Reduced profitability, in turn, brought on cutbacks and layoffs. Although bruised, these companies managed to update their product lines throughout the last 12 months.

The IBM world

One reason for this year's lower profitability was that, with few users chomping at the bit, IBM and PCMs found themselves in even more heated competition than usual. Gens claims that behind-the-scene price wars, with discounts of 25% and more, were commonplace.

On the new-product front, IBM and its two primary competitors, Amdahl Corp. and National Advanced Systems (NAS), kept up the traditional tit-for-tat game, most of which centered on higher performance hardware and the new operating environment from IBM, MVS/ESA.

ESA is the next frontier in large-systems computing because it opens up storage facilities and is said to improve the performance of key applications such as IBM's DB2 relational database management system. For instance, it offers up to 16 terabytes of virtual storage.

But this year's story was not of PCMs hassled by IBM — perhaps because IBM had enough of its own problems. Of all large-system suppliers, IBM had the most challenging year.

At the tail end of 1988, it managed relatively smooth launches for both ESA and its latest mainframe generation, the 3090 S models.

In February, the company introduced the 3090 100S, the new low end of the S family, which brought the point of entry to the latest mainframe generation — and, presumably, to ESA — to below $1 million. All together, the announcements showed users that moving to the newest mainframes and operating environment was the thing to do.

The first sign of trouble came in March when IBM announced that it had experienced problems with chips used in 3090 S models. The chip problem, which IBM refused to clearly define, caused enough S model shipment delays to negatively affect first-quarter revenue.

But IBM insisted that the problem was fixed and it expected to get back on track with S model shipments this year. Unfortunately for IBM, the S model chip news took some wind out of its first major ESA and 3090 S model push of the year, which had been launched a month earlier.

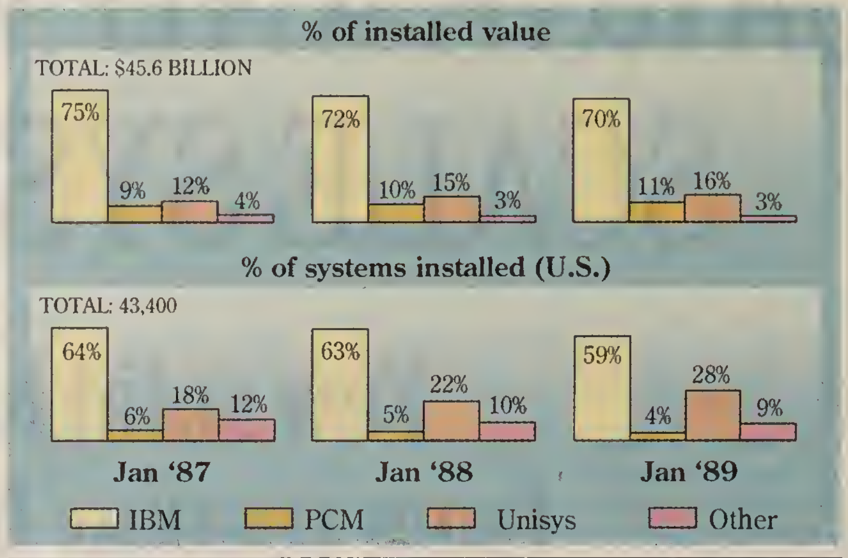
April brought another new 3090 and more ESA incentives. This time, IBM debuted the 3090 380S, which, for the first time, featured an asymmetrical capability for 3090s. Restricted to S models, this new feature, which IBM said it would eventually expand to all two-sided S models, would allow users to configure differing amounts of expanded storage and channels on either side of the processor complex. Previously, a user had to stack the same amounts of both on each side. The intent here was to save users money.

In the aftermath of this announcement, it might have seemed that IBM was gaining momentum in its quest for ESA/3090 S model implementation. Then, in June, reports began to surface that S model thermal conduction modules were failing in the field.

Observers attributed these failures to the earlier chip problem and claimed that IBM did not catch all the flawed chips that were initially produced. IBM vehemently denied this and claimed there had been only the few isolated failures typical of a new generation of systems. By late summer, it appeared that IBM had weathered the worst of the S model storm. "What we're hearing now is that the problems have been resolved," Gens says. "It looks like IBM has mopped it up."

Oops, I slipped . . .

While IBM continues to remain the solid leader in the mainframe market, it has lost ground to its nearest rival, Unisys



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Analysts said that despite the problems, a fair amount of users have moved to the ESA platform. Exact numbers are not yet available, but some analysts claim that up to 50% of 3090 installations will have moved to the new operating environment by year's end.

However, random interviews by *Computerworld* throughout 1989 showed that users, while committed to ESA, are moving slightly more cautiously than that 50% estimate would indicate.

Nonetheless, the foundation was put in place. "For the past 12 months, ESA has been a marketing success for IBM in that it got beyond the chip problems without a real taint of disaster," says Thomas Willmott of the Aberdeen Group, a Boston consulting firm.

In fact, some observers are now thinking beyond the S models to the next plateau: speculation on the next and final 3090 series, which is known as the G or A series. Opinion is mixed, with some predicting a fall debut, while others maintain it will be introduced in early 1990.

Gens says he expects that IBM's troubles with its S model will cause it to be extra wary with its G series announcement.

The past year was also a roller-coaster

Mainframe monthly

October: Data General introduces a new high-end machine, the MV/40000, which can be configured with up to four processors.

November: Honeywell Bull, Inc. (now Bull H. N. Information Systems, Inc.) introduces a high-end mainframe that the vendor claims offers twice the transaction processing performance of an IBM 3090.

December: The long-standing IBM/Fujitsu tiff is officially resolved by the American Arbitration Association. The dispute, which dates back to the early 1980s, focused on Fujitsu's access to IBM source code.

January: Unisys introduces its first small-scale implementation of a mainframe, the desktop Micro A. The new system brings the entry point to the Unisys mainframe line below $50,000.

February: IBM makes two announcements designed to serve as incentives for users to move to ESA. One is new ESA software; the other is the discontinuation of the sale of base-model, non-ESA 3090s.

March: The industry gets the first public report from IBM that some S model shipments will be delayed because of chip problems.

April: IBM puts more weight behind its push for ESA with the announcement of a new 3090, the Model 380S, which features an asymmetrical capability. Amdahl announces what it says is the biggest uniprocessor mainframe, the 350, which runs at 35 MIPS and sells for $3.8 million. It also announces the dual-processor Model 500 and the tri-processor 1100.

May: Hitachi and EDS finalize their joint purchase of NAS, marking Hitachi's entry into the U.S. market as a direct seller of mainframes. The venture will continue to sell under the NAS label.

June: User complaints about thermal conduction module failures with IBM 3090 S models surface. While IBM maintains that the failure rate is typical for a new product line, this represents a second setback for the line.

July: IBM cancels the product announcement of its long-awaited 3390 disk drive. NAS demonstrates ESA on its mainframe.

August: Amdahl unveils ESA on its mainframe one week after rival NAS, claiming that it can deliver lower end systems with ESA compatibility by October and that higher end 5990 mainframes will be ESA-ready in January.

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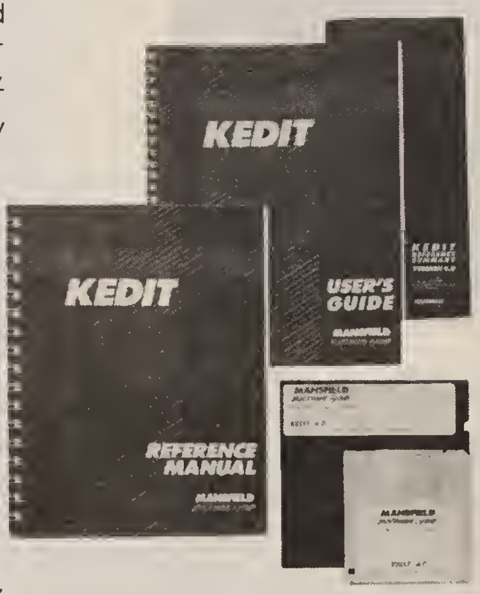

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ride for the two major PCMs — Amdahl and NAS. The highs were provided by a number of successes — and, in Amdahl's case, a bit of one-upmanship — in the ongoing game of catch-up that these vendors play with IBM.

Both companies said they would demonstrate systems with ESA capability in 1989, and both kept that promise. Amdahl and NAS will be making this capability available a full year after IBM, but the time lag should not affect them too much. A recent random survey of PCM users showed that a good chunk of them are planning ESA implementation for 1990 [CW, Aug. 21].

Amdahl jumped into 1989 with a blaze of glory. It first reported a stellar 1988 that showed a 53% earnings increase, to $1.8 billion. Next it announced an enhanced version of its mainframe-based Unix operating system, which was all the more sweet for Amdahl, because IBM was struggling to get its mainframe-based Unix out the door.

Perhaps the first sign that things were not perfect came when Amdahl pulled a copycat move and upped prices on most of its hardware by 5% in early April — a move that IBM had made in late March.

> ALTHOUGH IT DID well with product rollouts, Unisys was hit hard with the softened demand for mainframes in the U.S. this year.

But that was quicky followed in late April with the rollout of several new systems, including the 5990 Model 350, the fastest uniprocessor mainframe to date, which supposedly runs at 35 MIPS. Previously, NAS boasted that its AS/EX 60, at 27 MIPS, was the fastest uniprocessor mainframe.

Then, in July, Amdahl announced earnings of $32.8 million, 38% less than in the same quarter a year ago. The company attributed the expected dip to customers moving to its new models; Amdahl also cited increasingly competitive pricing from IBM.

The dips and peaks experienced by NAS in the past year had more to do with corporate identity and direction than with products. Most of the year was overshadowed by its ownership question.

It wasn't Memorex

Rumors floated around the industry for months that the firm was on the block. In early 1989, it appeared that Memorex Telex would become the new owner. But weeks of uncertainty followed as Memorex Telex missed two deadlines to step in as the new owner.

In March the team of Hitachi America Ltd. and Electronic Data Systems Corp. came in as the new owners, and the joint venture was finalized in May.

Other than its ESA demonstration, NAS had little to show on the product front. Recently, a company spokesman said the ownership issue did not affect the firm's plans to release products. Instead, he said the last 12 months were a time of adding enhancements to the latest AS/EX models, which were introduced a year ago. For instance, the company made a logical partitioning facility available for users of those mainframes in June.

Analysts were positive about the new corporate parents and expect the union to give NAS a boost. "In the long run, this acquisition will be a real shot in the arm for them," says Jeffry Beeler, an analyst at Dataquest, Inc. "They'll be a more formidable competitor than they have been in the recent past."

The world outside of the IBM market, once made up of the so-called BUNCH companies, is now a much smaller collection, headed these days by Unisys Corp. and Bull.

That duo held their own in terms of product releases in the last 12 months, with each delivering new top-of-the-line mainframes. The key to their success, analysts say, was keeping their installed bases happy enough to prevent them from taking the plunge into the IBM-compatible world.

"Unisys and the others continue to play an installed base strategy," Gens says. "The bad news for Unisys is that their customer bases are always evaluating the option of making the move to the IBM arena. The momentum is toward the [IBM] 370 architecture, and so they have to minimize their loss of market share."

Although it did well with product rollouts, Unisys was hit hard with the softened demand for mainframes in the U.S. this year. At summer's end, the company said bloated inventories would cause it to cut thousands of employeess — 8% of its work force — and initiate a hiring freeze. These moves are part of an overall restructuring that will be taking place at the company over the next several months.

Unisys had wrapped up 1988 by stumbling — it announced at year's end that one of its new higher end 2200 models would be delayed. It revised delivery for its 2200/400 to March 1989 and met that schedule. At the same time, it got its biggest system, the 2200/600, out to several customer sites as well.

One of Unisys' more interesting moves was the January introduction of the Micro A, a desktop mainframe that came from the Burroughs side of Unisys. The system, which was based on Unisys' new Scamp microprocessor, brought the A series mainframe down to a single-chip implementation.

The Scamp chip is significant for users

Continued on page 77

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Large systems

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPARABLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS[2])	PERFORMANCE (MFLOPS[3])	BENCHMARK[4]	MACHINE CYCLE TIME (nsec)	MEMORY RANGE (megabytes)	DISK TRANSFER RATE (megabyte/sec.)	NUMBER OF PORTS	NUMBER OF CHANNELS	OPERATING SYSTEMS	SUPPORTS ETHERNET OR TOKEN-RING	MAXIMUM NUMBER OF USERS/ TYPICAL NUMBER OF USERS	WORD LENGTH (bits)	BASE PRICE	DISTRIBUTION
Amdahl Corp. **(408) 746-6000**	5890-180E	Sept. 1987	DP, SE, TP	IBM 3090S	18.4	NP	NP	15	32-256	4.5	NP	16-48	VM, MVS, VSE	NP	NP	NP	$2,100,000	End user
	5890-190E	June 1987	Same as above	Same as above	22.4	NP	NP	15	32-256	4.5	NP	16-48	Same as above	NP	NP	NP	$2,468,000	End user
	5890-200E	March 1987	Same as above	Same as above	34	NP	NP	15	64-256	4.5	NP	32-64	Same as above	NP	NP	NP	$3,596,000	End user
	5890-300E	June 1987	Same as above	Same as above	42	NP	NP	15	64-256	4.5	NP	32-64	Same as above	NP	NP	NP	$4,200,000	End user
	5890-390E	Dec. 1988	Same as above	Same as above	42	NP	NP	15	256-512	4.5	NP	64-96	Same as above	NP	NP	NP	$6,589,000	End user
	5890-400E	Feb. 1988	Same as above	Same as above	58	NP	NP	15	128-512	4.5	NP	64-96	Same as above	NP	NP	NP	$6,851,000	End user
	5890-400E	Dec. 1987	Same as above	Same as above	75	NP	NP	15	128-512	4.5	NP	64-128	Same as above	NP	NP	NP	$6,851,000	End user
	5990-350	April 1989	Same as above	Same as above	34	NP	NP	10	64-1280	4.5	NP	32-64	Same as above	NP	NP	NP	$3,806,000	End user
	5990-500	May 1989	Same as above	Same as above	44	NP	NP	10	64-1280	4.5	NP	32-64	Same as above	NP	NP	NP	$4,620,000	End user
	5990-700	June 1988	Same as above	Same as above	63	NP	NP	10	64-1280	4.5	NP	32-64	Same as above	NP	NP	NP	$6,405,000	End user
	5990-1100	May 1989	Same as above	Same as above	91	NP	NP	10	128-2560	4.5	NP	64-128	Same as above	NP	NP	NP	$9,870,000	End user
	5990-1400	Dec. 1988	Same as above	Same as above	113	NP	NP	10	128-2560	4.5	NP	64-128	Same as above	NP	NP	NP	NP	End user
Bull H. N. Information Systems, Inc. **(617) 895-6000**	DPS 90/91	Fourth quarter 1984	DP, SE, TP	IBM 3090	NA	27 (P)	84 TPS DC, 5.0 LP, 3.84 LL (actual)	NP	32-128	NP	16	32	GCOS8	Both	NP/ 1,270	36	$3,550,000 with CPU, system control unit, 32M-byte memory, I/O processor, system control center, power supplies	End user
	DPS 90/92, 92T	Second quarter 1985	DP, SE, TP	IBM 3090	NA	54 (P)	151 TPS DC, 10 LP, 7.68 LL (actual)	NP	32-128	NP	32	64	GCOS8	Both	NP/ 2,295	36	$4,500,000 (1 system control unit, 1 I/O processsor), $5,630,000 (2 system control units, 2 I/O processors) with 2 CPUs, 32M-byte memory, system controller, power supplies	End user
	DPS 90/93	Third quarter 1986	DP, SE, TP	IBM 3090	NA	81 (P)	214 TPS DC, 15 LP, 11.52 LL (actual)	NP	64-256	NP	48	64	GCOS8	Both	NP/ 3,440	36	$6,500,000 with 3 CPUs, 2 system control units, 32M-byte memory, 3 I/O processors, 2 system controllers, power supplies	End user
	DPS 90/94	Fourth quarter 1986	DP, SE, TP	IBM 3090	NA	108 (P)	270 TPS DC, 20 LP, 15.36 LL (actual)	NP	64-256	NP	64	64	GCOS8	Both	NP/ 4,050	36	$7,600,000 with 4 CPUs, 2 system control units, 32M-byte memory, 4 I/O processors, 2 system controllers, power supplies	End user
	DPS 8000/82, 83, 84	Third quarter 1987 (Model 82), third quarter 1988	DP, TP	IBM 3090	NA	NP	50, 75, 100 TPS DC (actual)	NP	32-256	NP	NA	32, 48, 64	GCOS8	Both	NP/830, 1,165, 1,470	36	$1,300,000 (2 CPUs, 2 I/O processors), $1,835,000 (3 CPUs, 3 I/O processors), $2,370,000 (4 CPUs, 4 I/O processors) with 2 system control units, 16M-byte memory, power supplies	End user
	DPS 9000/91	June 1989	DP, SE, TP	IBM 3090	NA	NP	273 TPS DC (actual)	NP	128-512	NP	NA	128	GCOS8	Both	NP	36	$5,856,400 with CPU, system control unit, 128M-byte memory, I/O processor	End user
	DPS 9000/92T	July 1989	DP, SE, TP	IBM 3090	NA	NP	518 TPS DC (actual)	NP	256-1024	NP	NA	256	GCOS8	NP	NP	36	$11,248,400 with 2 CPUs, 2 system control units, 256M-byte memory, 2 I/O processors	End user
	DPS 9000/93	Aug. 1989	DP, SE, TP	NA	NA	NP	764 TPS DC (actual)	NP	256-1024	NP	NA	256	GCOS8	Both	NP	36	$17,117,200 with 3 CPUs, 2 system control units, 256M-byte memory, 3 I/O processors	End-user
	DPS 9000/94	Fourth quarter 1989	DP, SE, TP	NA	NA	NP	1010 TPS DC (actual)	NP	256-1024	NP	NA	256	GCOS8	Both	NP	36	$22,967,400 with 4 CPUs, 2 system control units, 256M-byte memory, 4 I/O processors	End user

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*One DEC MIPS equals the performance of the VAX-11/780.

[1] DP = Commercial data processing; SE = scientific/engineering; TP = on-line transaction processing; OA = office automation.

[2] Millions of instructions per second.

[3] Full-precision millions of floating-point operations per second; S = sustained; P = peak.

[4] Per-second performance ratings, based on the following industry-standard benchmarks: DH = Dhrystone Version 1.1 (peephole optimization only); DC = Debit/Credit (transactions based on 95% subsecond responses); LP = Linpack (100 x 100 full-precision in MFLOPS); LL = Livermore Loops (harmonic mean; 14 loops). Vendors supplied either actual or estimated benchmark figures.

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld.* When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPARABLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS[2])	PERFORMANCE (MFLOPS[3])	BENCHMARK[4]	MACHINE CYCLE TIME (nsec)	MEMORY RANGE (megabytes)	DISK TRANSFER RATE (megabyte/sec.)	NUMBER OF PORTS	NUMBER OF CHANNELS	OPERATING SYSTEMS	SUPPORTS ETHERNET OR TOKEN-RING	MAXIMUM NUMBER OF USERS/ TYPICAL NUMBER OF USERS	WORD LENGTH (bits)	BASE PRICE	DISTRIBUTION
Control Data Corp. (800) 553-2215 Ext. 100	Cyber 992-31, 32	Sept. 1988	DP, SE, TP	IBM 3090S	32.54-37.76, 65.08-75.52	57.3 (S), 62.5 (P)	12 LP (actual)	16	64-256	1.2-12	NP	8-36	NOS/VE	Ethernet	Unltd./ 200-300	64	$1,900,000 (1 CPU), $3,100,000 (2 CPUs) with 64M-byte memory, eight I/O channels	End user
	Cyber 994-31, 32	Sept. 1988	DP, SE, TP	IBM 3090	32.54-37.76, 65.08-75.52	57.3 (S), 62.5 (P)	12 LP (actual)	16	64-256	1.2-12	NP	24-52	NOS/VE, NOS/BE	Ethernet	Unltd./ 200-300	64	$2,100,000 (1 CPU), $3,300,000 (2 CPUs) with 64M-byte memory, 24 I/O channels	End user
	Cyber 962-31, 32	Oct. 1988	Same as above	IBM 3090S, DEC VAX 6000	17.55-35.1	3.3 (S)	335.44 DC, 3.3 LP, 3.7 LL (actual)	11.2	64-256	1.2-12	NP	8-36	NOS/VE	Ethernet	Unltd./ 200	64	$951,750 (1 CPU), $1,570,250 (2 CPUs) with 64M-byte memory, eight I/O channels	End user
	Cyber 960-31, 32	Oct. 1988	Same as above	Same as above	Same as above	3.3 (S)	Same as above	11.2	64-256	1.2-12	NP	24-52	NOS/VE, NOS/BE	Ethernet	Unltd./ 110-200	64	$1,057,500 (1 CPU), $1,676,000 (2 CPUs) with 64M-byte memory, 24 I/O channels	End user
Data General Corp. (800) 328-2436	Eclipse MV/40000 HA Series	1989	All	IBM 3090	14.1-54.2	NP	17.1-65.6 DH 2.0 (estimate)	50	64-256	60	3,456	7	AOS/VS	Ethernet	3,456/ 1,200	32	$629,000-$1,585,000 with 64M- to 96M-byte memory, one I/O channel	End user, OEM, VAR
Digital Equipment Corp. Contact local sales office	VAX 6000 Model 460	July 1989	All	NA	Up to 36*	NP	NP	28	128-192	2.8	NP	NP	VMS	Ethernet	NP/ 1,000	32	$752,0004 with 128M-byte memory	End user, OEM, VAR
IBM (800) 426-3333	3090 Model 120S	Aug. 1988	All	NA	NP	NP	NP	18.5	32-64	4.5	NP	16-32	MVS, VM, TPF, VSE	Both	NP	32	$1,018,000 with 16 channels, CPU controller	NP
	3090 Model 150S	Aug. 1988	All	NA	NP	NP	NP	17.75	32-256	4.5	NP	16-32	MVS, VM, VSE	Both	NP	32	$1,713,000 with 16 channels	NP
	3090 Model 170S	Nov. 1988	All	NA	NP	NP	NP	17.75	32-256	4.5	NP	16-32	Same as above	Both	NP	32	$2,185,000 with 16 channels	NP
	3090 Model 180S	Nov. 1988	All	NA	NP	133 (P)	19 LL (estimate)	15	32-256	4.5	NP	16-32	Same as above	Both	NP	32	$2,973,000 with 16 channels	NP
	3090 Model 280S	Dec. 1988	All	NA	NP	NP	NP	15	64-512	4.5	NP	32-64	Same as above	Both	NP	32	$5,607,000 with 32 channels	NP
	3090 Model 200S	Nov. 1988	All	NA	NP	266 (P)	NP	15	64-1024	4.5	NP	32-64	Same as above	Both	NP	32	$5,112,000 with 32 channels	NP
	3090 Model 250S	June 1989	All	NA	NP	NP	NP	17.75	64-512	4.5	NP	32-64	Same as above	Both	NP	32	$3,350,000 with 32 channels	NP
	3090 Model 300S	Nov. 1988	All	NA	NP	399 (P)	NP	15	64-1024	4.5	NP	32-64	Same as above	Both	NP	32	$6,954,000 with 32 channels	NP
	3090 Model 380S	NP	All	NA	NP	NP	NP	15	128-1280	4.5	NP	48-96	Same as above	Both	NP	32	$7,990,000 with 48 channels	NP
	3090 Model 400S	Dec. 1988	All	NA	NP	532 (P)	NP	15	128-2048	4.5	NP	64-128	Same as above	Both	NP	32	$9,885,000 with 64 channels	NP
	3090 Model 500S	Dec. 1988	All	NA	NP	667 (P)	NP	15	128-2048	4.5	NP	64-128	Same as above	Both	NP	32	$11,360,000 with 64 channels	NP
	3090 Model 600S	Sept. 1988	All	NA	NP	798 (P)	NP	15	128-2048	4.5	NP	64-128	MVS, VM, TPF, VSE	Both	NP	32	$12,836,000 with 64 channels	NP
National Advanced Systems (408) 970-1000	AS/EX 25, 30	Second quarter 1987	DP, SE	IBM 3090	8.3, 12	NP	2.9, 4.8 LP, 2.3, 3.5 LL	20	32-256	3-6	NP	8-32	MVS, VM, MVS/XA, VM/XA, MVS/ESA	NP	NP	32	$749,650, $1,117,150	End user
	AS/EX 35	First quarter 1989	DP, SE	IBM 3090	14	NP	NP	20	32-256	3-6	NP	8-32	MVS, VM, MVS/XA, VM/XA, MVS/ESA	NP	NP	32	$1,529,050	End user
	AS/EX 40	Third quarter 1987	DP, SE	IBM 3090	21.7	NP	NP	20	32-256	3-6	NP	8-32	MVS, VM, MVS/XA, VM/XA, MVS/ESA	NP	NP	32	$2,243,350	End user
	AS/EX 50, 90, 100	Fourth quarter 1986	DP, SE	IBM 3090	22.3, 70, 88	121, 364, 485 (P)	17.9 LP, 9.9 LL	16.5 (50 only)	64M-1G, 128M-2G, 256M-2G	3-6	NP	16-48, 48-128, 64-128	MVS, VM, MVS/XA, VM/XA, MVS/ESA	NP	NP	32	$2,304,300, $8,406,200, $9,550,000	End user
	AS/EX 60, 80	Second quarter 1986	DP, SE	IBM 3090	28.3, 50.9	121 (P) (Model 60)	49 LP, 9.88 LL (scalar), 13.5 LL (vector) (Model 60)	16.5	64M-1G	3-6	NP	32-64	MVS, VM, MVS/XA, VM/XA, MVS/ESA	NP	NP	32	$3,450,100, $4,932,000	End user
	AS/EX 65	Second quarter 1988	DP, SE	IBM 3090	39	NP	NP	16.5	256M-2G	3-6	NP	32-96	MVS, VM, MVS/XA, VM/XA, MVS/ESA	NP	NP	32	$5,647,950	End user
	AS/EX 70	First quarter 1987	DP, SE	IBM 3090	40.2	NP	NP	16.5	64M-1G	3-6	NP	32-64	MVS, VM, MVS/XA, VM/XA, MVS/ESA	NP	NP	32	$3,766,900	End user
	AS/EX 75	NP	DP, SE	IBM 3090	49.6	NP	NP	16.5	256M-2G	3-6	NP	64-128	MVS, VM, MVS/XA, VM/XA, MVS/ESA	NP	NP	32	$7,148,200	End user
	AS/EX 95	NP	DP, SE	IBM 3090	70	NP	NP	16.5	256M-2G	3-6	NP	64-128	MVS, VM, MVS/XA, VM/XA, MVS/ESA	NP	NP	32	$8,994,400	End user
Prime Computer, Inc. (508) 655-8000	6550	Dec. 1987	All	IBM 3090, DEC 6000	23.6	NP	NP	44	32-128	2.4	512	NA	Primos	Ethernet	960/450	32	$811,600 with 32M-byte memory, 817M disks, terminal, power supplies	VAR
Tandem Computers, Inc. (408) 725-6000	Nonstop VLX504, 508, 516, 532	Oct. 1988	TP	IBM 3090	12-96	NA	NP	83.3	64-3072	1.2-1.8	NP	Up to 32	Guardian 90	Ethernet	NP	32	$1,208,000 with four CPUs, 64M-byte memory, 4.6G-byte disk, tape drive, terminal, power supplies	End user

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPARABLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS[2])	PERFORMANCE (MFLOPS[3])	BENCHMARK[4]	MACHINE CYCLE TIME (nsec)	MEMORY RANGE (megabytes)	DISK TRANSFER RATE (megabyte/sec.)	NUMBER OF PORTS	NUMBER OF CHANNELS	OPERATING SYSTEMS	SUPPORTS ETHERNET OR TOKEN-RING	MAXIMUM NUMBER OF USERS/ TYPICAL NUMBER OF USERS	WORD LENGTH (bits)	BASE PRICE	DISTRIBUTION
Unisys Corp. **(215) 542-4011**	A 12, 12E	Aug. 1986, Nov. 1987	DP, TP	IBM 3090S	NP	NP	NP	65	24-144, 24-72	3	NP	32-48	MCP/AS	Ethernet	NP	48	$1,380,000, $842,000 with CPU, 24M-byte memory, console, I/O subsystem	NP
	A 12T	May 1988	DP, TP	IBM 3090S	NP	NP	NP	65	24-144	3	NP	48-64	MCP/AS	Ethernet	NP	48	$2,110,000 with CPU, 24M-byte memory, console, I/O subsystem	NP
	A 17F, H, J	May 1988	DP, TP	IBM 3090S	NP	NP	NP	65	48-288	3	NP	64-128	MCP/AS	Ethernet	NP	48	$3,310,000 (1 CPU), $4,690,000 (1 CPU), $6,000,000(2 CPUs) with 48M-byte memory, console, I/O subsystem	NP
	A 17L, N	June 1988	DP, TP	IBM 3090S	NP	NP	NP	65	48-576	3	NP	16-258	MCP/AS	Ethernet	NP	48	$7,740,000 (3 CPUs), $9,490,000 (4 CPUs) with 96M-byte memory, console, I/O subsystem	NP
	2200/405, 406	Aug. 1989	DP, TP	IBM 3090S	NP	NP	NP	80	16-64	3	NA	4-64	OS/1100	Ethernet	NP	36	$808,000 (5 CPUs, 5 I/O processors), $952,000 (6 CPUs, 6 I/O processors) with 16M-byte memory, console	NP
	2200/611, 612	March 1989	DP, SE, TP	IBM 3090S	NP	NP	NP	15	32-64	3	NP	4-44, 8-88	OS/1100 SB3	Ethernet	NP	36	$2,130,000 (1 I/O processor), $2,400,000 (2 I/O processors) with CPU, 32M-byte memory, console	NP
	2200/621, 624	March 1989	DP, SE, TP	IBM 3090S	NP	NP	NP	15	64	3	NP	4-44, 16-176	OS/1100 SB3	Ethernet	NP	36	$3,990,000 (1 I/O processor), $4,800,000 (4 I/O processors) with two CPUs, 64M-byte memory, console	NP
	2200/632, 633, 634	June 1989	DP, SE, TP	IBM 3090S	NP	NP	NP	15	64-128	3	NP	8-88, 12-132, 16-176	OS/1100 SB3	Ethernet	NP	36	$5,760,000 (2 I/O processors), $6,030,000 (3 I/O processors), $6,300,000 (4 I/O processors) with three CPUs, 64M-byte memory, console	NP
	2200/643, 644	June 1989	DP, SE, TP	IBM 3090S	NP	NP	NP	15	128	3	NP	12-132, 16-176	OS/1100 SB3	Ethernet	NP	36	$7,700,000 (3 I/O processors), $8,000,000 (4 I/O processors) with four CPUs, 128M-byte memory, console	NP
	2200/644MP	June 1989	DP, SE, TP	IBM 3090S	NP	NP	NP	15	64	3	NP	16-176	OS/1100 SB3	Ethernet	NP	36	$8,660,000 with four CPUs, 64M-byte memory, I/O processor	NP
	V510	Feb. 1988	DP, TP	IBM 3090S	NP	NP	NP	48	20-80	3	NP	16-64	MCP/VS	NA	NP	40	$950,000 for CPU, 20M-byte memory, I/O subsystem, console	NP
	V530, 560	Nov. 1987, Aug. 1989	DP, TP	IBM 3090S	NP	NP	NP	48	40-160	3	NP	32-64	MCP/VS	NA	NP	40	$1,775,000 (1 CPU), $2,890,000 (2 CPUs) with 40M-byte memory, I/O subsystem, console	NP

Few solid hits

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because for the first time it offers them a desktop system that is compatible with the A series mainframe. The chip allows Unisys to save development costs by building one chip and then modifying it for use in its other mainframe line. It demonstrated that capability with the announcement of the System 80 Model 7E.

In the meantime, Unisys introduced several other new systems, including the A 12-B, which became the new entry point to its higher end A series processors. Unlike the previous entry point, the A 12-B will now allow users to field-upgrade to bigger A series processors.

There was far less activity on the part of Bull in the large-systems market. One big step, however, was the introduction and delivery of the DPS 9000, a new top-of-the-line system that reportedly outperforms even the IBM 3090 when it comes to transaction processing.

Initial reaction to the new mainframe was positive, although observers say Bull is still plagued by its ownership issue, which began when Honeywell sold off most of its stake in the company in late 1986.

Although this issue was cleared up this year, the evolving status of the company caused some users to feel uncertain about the company's future.

For all the large-systems vendors, the last 12 months was a moderate success. But while most goals were met, none of the vendors came through with flying colors. They all struggled with a slowdown in demand, with some companies feeling that pinch more than others. And they will all take this challenge with them into the next year. •

How the charts work

The Hardware Roundup charts are intended as a guide for readers interested in comparing products from major vendors in various size and price classes.

Computerworld has tried to present complete, accurate listings of as many products as possible, contacting vendors directly for information. Space does not permit inclusion of all products or vendors in each category.

Where possible, the parameters used to group computer systems with their likely competitors were defined in the following manner:

- **Large systems** typically support more than 128 users and cost more than $750,000.
- **Medium-scale systems** normally support 17 to 128 users and are priced in the $100,000 to $750,000 range.
- **Special-purpose systems** are defined as database machines and high-speed scientific computers, including supercomputers, minisupers and vector processing machines.

These definitions are general guidelines and cannot be strictly applied in every case. In instances in which systems cannot be classified on a purely numeric basis, the editors have attempted to categorize them in a manner consistent with common practice.

Similarly, many who evaluate systems look for numbers that indicate how each computer handles a particular well-defined series of tasks.

In the absence of such numbers, the charts include millions of instructions per second — as provided by the vendors or estimated by *Computerworld* based on vendors' claims — and other performance numbers supplied by vendors in response to a questionnaire. The latter include millions of floating-point operations per second and Dhrystone, ET1 Debit/Credit, Linpack and Livermore Loops benchmarks. The goal was to show how systems perform in selected environments.

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Midsize vendors set new course

BY MARYFRAN JOHNSON

Caught between the devil of intelligent workstations and the Big Blue sea of mainframe computing, medium-scale systems sailed off in RISCy new directions this past year.

The demand for reduced instruction set computing (RISC)-based technology became a rising tide that even the giant of medium-scale systems, Digital Equipment Corp., could no longer swim against.

MEDIUM-SCALE SYSTEMS

DEC made the biggest splash among medium-scale vendors this past July by unveiling its RISC line of Decsystem 5400 and 5800 minicomputers alongside the latest models in the VMS-based VAX 6000 line.

"People overlook DEC's ability to change what it's doing dramatically," says Bob Randolph, director of program services for Technology Financial Services, Inc. in Westford, Mass. "One of DEC's biggest weaknesses in 1988 was its lack of RISC products. Now, a year later, it has a family of RISC processors. Not many large companies can move that fast."

IBM is expected to dive into double-architecture offerings in the near future with a family of RISC-based RT workstations that approaches medium-scale territory. Some analysts anticipate that the machines will offer support for up to 500 users.

Secret of my success

Beyond new or impending product introductions, the real success story this year was IBM's Application System/400, considered by analysts to be the most cleverly marketed machine in the computer giant's history.

"The AS/400 is not an innovative product, but it was an excellent marketing job," says John Logan, executive vice-president of the Aberdeen Group in Boston. "There were leaks on the product for nine months ahead of time, advisory councils all over the place and advertising glitz around the world. I've never seen anything done as well."

The machine not only boosted the midrange market overall, but it also allowed IBM to reclaim market share lost to DEC and other minicomputer makers. In the space of six months, IBM increased its 27% share of the U.S. intermediate-systems market to 42% by the end of 1988, according to Phoenix-based market researcher Annex Research.

DEC's share of medium-scale shipments, however, fell from 45% in mid-1988 to 37% by year's end, the Annex figures show.

"DEC is now facing tough competition from IBM [in the midrange] and HP and Sun in workstations. They're looking at a fundamentally changed environment from two years ago," points out Bob Herwick, an industry analyst at Hambrecht & Quist in New York. "Its product margins are under pressure."

Then again, so are everybody else's. "The bloom is off the growth for everybody," notes Byron Walker, assistant vice-president of Moody's Investors Service, Inc. in New York. "With downsizing and the rise of open architecture, there is not a lot of profit margin left."

In the meantime, a determined flotilla of competitors — such as Data General Corp., Unisys Corp. and the newly merged Hewlett-Packard Co. and Apollo Computer, Inc. — is keeping the water churning with RISC-based products of their own.

Don Bellomy, director of processing at International Data

Continued on page 83

Johnson is a senior writer at *Computerworld.*

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Medium-scale systems

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPARABLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS[2])	PERFORMANCE (MFLOPS[3])	BENCHMARK[4]	MACHINE CYCLE TIME (nsec)	MEMORY RANGE (megabytes)	DISK TRANSFER RATE (megabyte/sec.)	NUMBER OF PORTS	NUMBER OF CHANNELS	OPERATING SYSTEMS	SUPPORTS ETHERNET OR TOKEN-RING	MAXIMUM NUMBER OF USERS/ TYPICAL NUMBER OF USERS	WORD LENGTH (bits)	BASE PRICE	DISTRIBUTION
Arix Corp. (408) 432-1200	Arix System 90 Model 40	Feb. 1989	DP, OA, TP	NP	4.2	NA	70 DC (estimate)	40	8-416	2.4-4	NP	NP	Unix System V, Release 3.1	Ethernet	256/128	64	$116,000 with 16M-byte memory, 150M-byte tape drive, 380M-byte disk	OEM
	Arix System 90 Model 80	Feb. 1989	DP, OA, TP	NP	32	NA	70 DC (estimate)	40	8-416	2.4-4	NP	NP	Unix System V, Release 3.1	Ethernet	512/NP	64	$159,000 with 2 CPUs, 16M-byte memory, 150M-byte tape drive, 760M-byte disk	OEM
AT&T (201) 221-2000	3B4000	March 1988	TP	IBM 9370, AS/400, DEC 8800	NP	NP	NP	NP	8-272	7-18.8	16	NP	Unix System V	Ethernet	400/160	32	$275,000 with CPU, 8M-byte memory, 120M-byte tape cartridge	End user, OEM, VAR
Concurrent Computer Corp. (201) 758-7500	3280E MPS	1989	DP, SE, TP	DEC VAX 6000	12-72	NP	NP	100	16-512	3	48	NA	OS/32	Ethernet	512/100	32	$360,000 with 16M-byte memory	End user, OEM, VAR
	MicroThree MPS, MicroFive MPS	April 1989	DP, SE, TP	DEC VAX 6000	3.5-20, 6.85-35	NP	NP	NP	8-256	3	32	4	OS/32	Ethernet	128/64, 256/80	32	$180,000, $260,000 with 16M-byte memory	End user, OEM, VAR
	3280 MPS	1986	DP, SE, TP	DEC VAX 6000	6.4-33.8	NP	12.1 DC, 1.2-7.2 LP (actual)	100	8-128	3	32	NP	OS/32	Ethernet	512/ 100	32	$300,000 with 16M-byte memory	OEM, VAR
Control Data Corp. (800) 553-2215	Cyber 932-31, 32	March 1987	DP, SE, TP	DEC VAX 6000, IBM 4381, 9377	3.63, 7.26	0.64 (S)	101.75 DC, 0.64 LP, 0.69 LL (actual)	50	8-128	1.8-3	NP	6-12	NOS/VE	Ethernet	NP/25	64	$137,690 (1 CPU, 8M-byte memory), $233,580 (2 CPUs, 16M-byte memory)	End user
	Cyber 960-11, 962-11	Oct. 1988	DP, SE, TP	DEC VAX 6000, IBM 4381, 3090	10.53	2	204.62 DC (estimate), 2.0 LP, 2.2 LL (actual)	11.2	64-256, 32-256	1.2-12	NP	24-52, 8-36	NOS/VE; NOS, NOS/BE (960-11)	Ethernet	NP/60	64	$705,000 with CPU, 64M-byte memory, $535,500	End user
Data General Corp. (800) 328-2436	Eclipse MV/15000 Model 10	1986	All	DEC Microvax 3900, VAX 6310	3057, 4596	0.6, 0.8	2857, 4629 DH (actual)	85	16-64	2.67-5	512	2	AOS/VS, DG/UX, AOS/RT32	Ethernet	512/100	32	$86,200-$146,900 with 16M-byte memory, 662M-byte disk	End user, OEM, VAR
	Eclipse MV/15000 Model 20	1986	All	DEC VAX 6320	7134	1.0	9090 DH, 0.64 LP, 1 LL (actual)	85	16-64	2.67-5	512	2	AOS/VS, DG/UX, AOS/RT32	Ethernet	512/160	32	$241,100 with 16M-byte memory, 662M-byte disk	End user, OEM, VAR
	Eclipse MV/20000 Model 2	1986	All	DEC VAX 8810, 8820	7.1	1	9090 DH, 0.64 LP, 1 LL (actual)	85	16-64	35	1,008	3	AOS/VS, DG/UX, AOS/RT32	Ethernet	1,008/ 200	32	$321,000-$421,000 with 16M-byte memory	End user, OEM, VAR
	Eclipse MV/40000	1988	All	DEC VAX 8820	14,075	2	16129 DH, 1 LP, 2 LL (actual)	50	32-128	37	1024	3	AOS/VS, AOS/RT32	Ethernet	1,024/ 400	32	$465,000 with 32M-byte memory	End user, OEM, VAR
Digital Equipment Corp. Contact local DEC sales office	VAX 6000 Model 210	April 1988	All	NA	2.8*	NP	NP	80	32-256 (VMS), 32-128 (Ultrix)	2.8	NP	NP	VMS, Ultrix-32	Ethernet	NA/ 40-180	32	$101,600 (Ultrix), $146,128 (VMS) with 32M-byte memory	End user, OEM, VAR
	VAX 6000 Model 310	Jan. 1989	All	NA	3.8*	NP	NP	60	Same as above	2.8	NP	NP	VMS, Ultrix-32	Ethernet	NA/ 50-225	32	$155,200 (Ultrix), $201,660 (VMS) with 32M-byte memory	End user, OEM, VAR
	VAX 6000 Model 410	July 1989	All	NA	7*	NP	NP	28	Same as above	2.8	NP	NP	VMS, Ultrix-32	Ethernet	NA/ 75-325	32	$204,700 (Ultrix), $239,000 (VMS) with 32M-byte memory	End user, OEM, VAR
	VAX 6000 Model 420	July 1989	All	NA	Up to 13*	NP	NP	28	64-256 (VMS), 64-128 (Ultrix)	2.80	NP	NP	VMS, Ultrix-32	Ethernet	NA/ 125-500	32	$376,000 (Ultrix), $399,000 (VMS) with 64M-byte memory	End user, OEM, VAR
	VAX 6000 Model 430	July 1989	All	NA	Up to 19*	NP	NP	28	64-256	2.8	NP	NP	VMS	Ethernet	NA/ 160-600	32	$489,000 with 64M-byte memory, VMS	End user, OEM, VAR
	VAX 6000 Model 440	July 1989	All	NA	Up to 25*	NP	NP	28	128-256	2.80	NP	NP	VMS	Ethernet	NA/ 200-800	32	$627,000 with 128M-byte memory, VMS	End user, OEM, VAR
	VAX 6000 Model 450	July 1989	All	NA	Up to 31*	NP	NP	28	128-192	2.8	NP	NP	VMS	Ethernet	NA/ 225-900	32	$700,000 with 128M-byte memory, VMS	End user, OEM, VAR
	Decsystem 5810	July 1989	SE	NA	18.7 integer	NP	NP	40	32-256	2.8	NP	NP	Ultrix-32	Ethernet	NP/NP	NP	$99,900 with 32M-byte memory, Ultrix	End user, OEM, VAR
	Decsystem 5820	NP	SE	NA	Up to 36 integer	NP	NP	40	64-256	2.8	NA	NA	Ultrix-32	Ethernet	NP/NP	NP	$174,900 with 64M-byte memory, Ultrix	End user, OEM, VAR
Encore Computer Corp. (305) 587-2900	Multimax 510	NP	DP, SE, TP	NP	17-85	5.5-27.5 (S)	NP	80	32-80	1.5-18	500	NP	Unix System V	Ethernet	500+/ NP	64	$149,000 with 32M-byte memory	End user, OEM
	Multimax 520	NP	DP, SE, TP	NP	17-170	5.5-55 (S)	NP	80	32-160	3-36	1,000	NP	Unix System V	Ethernet	1,000/ NP	64	$199,000 with 32M-byte memory	End user, OEM
	Concept 32/99 Series	First quarter, 1984	SE	DEC VAX 8600	10.7	NP	NP	75	4-16	3	256	16	MPX-32	Ethernet	256/ 96-128	32	$205,000 with 8M-byte memory, 128K-byte cache, CPU, dual floppy disk drives	End user, OEM
	Concept 32/2030, 2040	NP	SE	NA	5-80	NP	NP	75-150	4-256	2.40	NP	NP	MPX-32	Ethernet	NP/NP	32	$140,000-$295,000 with CPU, 4M-byte memory	End user, OEM

*One DEC MIPS equals the performance of the DEC VAX-11/780.
**Some figures obtained from 1988 *Computerworld* Hardware Roundup.
***Using Argonne National Laboratory vector unrolling technique and Add/Multily Assist Microcode.
[1] DP=Commercial data processing; SE=scientific/engineering; TP=on-line transaction processing; OA=office automation.
[2] Millions of instructions per second.
[3] Full-precision millions of floating-point operations per second; S=sustained; P=peak.
[4] Per-second performance ratings, based on the following industry-standard benchmarks: DH=Dhrystone Version 1.1 (peephole optimization only); DC=Debit/Credit (transactions based on 95% subsecond responses); LP=Linpack (100 x 100 full-precision in MFLOPS); LL=Livermore Loops (harmonic mean; 14 loops). Vendors supplied either actual or estimated benchmark figures.

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPARABLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS[2])	PERFORMANCE (MFLOPS[3])	BENCHMARK[4]	MACHINE CYCLE TIME (nsec)	MEMORY RANGE (megabytes)	DISK TRANSFER RATE (megabyte/sec.)	NUMBER OF PORTS	NUMBER OF CHANNELS	OPERATING SYSTEMS	SUPPORTS ETHERNET OR TOKEN-RING	MAXIMUM NUMBER OF USERS/ TYPICAL NUMBER OF USERS	WORD LENGTH (bits)	BASE PRICE	DISTRIBUTION
General Automation, Inc. **(714) 778-4800**	GA 7820	May 1985	DP, TP	NA	NP	NP	NP	150	4-32	3.5	128	128	Pick	Token-Ring	128/48	32	$112,500 with CPU, 410M-byte disk, 4M-byte memory	Dealer, VAR
	GA 8830	March 1988	DP, TP	NA	NP	NP	NP	60	4-32	3.5	256	256	Pick	Token-Ring	256/90	32	$186,200 with Intel terminal, 580 disk, 8M-byte memory	Dealer, VAR
Harris Computer Systems Division **(800) 442-7747**	HCX 2500	July 1987	DP, OA	DEC VAX 8530, IBM 9370	5	NP	5544 DH (actual)	100	16-64	3	64	6	CX/UX, CX/SX	Both	64/50	32	$99,000 with CPU, 16M-byte memory	End user, OEM, VAR
	HCX 2550	Jan. 1989	DP, OA, SE	DEC VAX 8530, IBM 9370	8	NP	11,575 DH (actual)	100	16-64	3	64	6	Same as above	Both	128/100	32	$149,000 with CPU, 16M-byte memory	End user, OEM, VAR
	HCX 2900	May 1987	DP, OA, SE	DEC VAX 8650, 8810	8	NP	11,575 DH (actual)	100	16-128	3	256	39	Same as above	Both	256/150	32	$165,000 with CPU, 16M-byte memory	End user, OEM, VAR
	H-800	Aug. 1982	SE	NP	1.58	0.23 (S)	0.23 LP (actual)	150	7.68-12	2.4	128	31	VOS, RT-VOS, VUE	Ethernet	128/NP	32/48	$164,000	End user, OEM, VAR
	H-900	Aug. 1987	SE	NP	4.8	0.57 (S)	0.57 LP (actual)	75	1.5-12	2.4	96	18	Same as above	Ethernet	192/NP	32/48/ 64/96	$240,000	End user, OEM, VAR
	H-1000	Jan. 1984	SE	NP	4.8	0.57 (S)	0.57 LP (actual)	75	1.5-12	2.4	192	31	Same as above	Ethernet	192/NP	32/48/ 64/96	$250,000	End user, OEM, VAR
	H-1100	Aug. 1987	SE	NP	5	0.85 (S)	0.85 LP (actual)	75	1.5-12	2.4	96	19	Same as above	Ethernet	224/NP	32/48/ 64/96	$260,000	End user, OEM, VAR
	H-1200	June 1985	SE	NP	5	0.85 (S)	0.85 LP (actual)	75	1.5-12	2.4	224	31	Same as above	Ethernet	224/NP	32/48/ 64/96	$290,000	End user, OEM, VAR
	H-1500	Aug. 1987	SE	NP	10	1.7 (S)	1.7 LP (actual)	75	1.5-12	2.4	320	50	Same as above	Ethernet	320/NP	32/48/ 64/96	$555,000	End user, OEM, VAR
	H-1600	Sept. 1987	SE	NP	15	2.55 (S)	2.55 LP (actual)	75	1.5-12	2.4	416	69	Same as above	Ethernet	416/NP	32/48/ 64/96	$795,000	End user, OEM, VAR
	Night Hawk Model 3800	April 1989	SE	NP	6-48	NP	6760-54,080 DH, 0.4-3.2 LP, 0.31-4.79 LL (actual)	50	296	3	160	27	CX/UX, CX/SX, CX/RT	Both	512/ 75-100	32	$155,000 with CPU, 96K-byte cache	End user, OEM, VAR
	Night Hawk Model 3400	April 1989	SE	NP	6-24	NP	6760-27,040 DH, 0.4-1.6 LP, 0.31-2.39 LL (actual)	50	136	3	64-128	8-27	CX/UX, CX/SX, CX/RT	Both	256/64	32	$75,000 with CPU, 96K-byte cache	End user, OEM, VAR
Honeywell Bull **(617) 595-6000**	DPS 8000/41	Third quarter 1988	DP, TP	IBM 4381	NP	NP	18 DC (actual)	NP	16-128	NP	NA	16	GCOS8	NP	NP/300	36	$450,000 with CPU, 16M-byte memory	End user
	DPS 8000/81	Third quarter 1987	DP, TP	IBM 3090, 4381	NP	NP	28 DC (actual)	NP	16-128	NP	NA	16	GCOS8	NP	NP/460	36	$675,000 with CPU, 16M-byte memory	End user
Hewlett-Packard Co. **(800) 752-0900** **Dept. 282E**	HP 9000 Model 835SE	May 1988	DP, SE	DEC 5400	14	2.3	23.42 DH, 5.9 DC, 2.02-2.6 LP (actual)	66	24-112	5-8	78	NP	HP-UX	Ethernet	128/ 32-96	32	$101,950 with 24M-byte memory, power supply	End user, OEM, VAR
	HP 9000 Model 850	Second quarter 1987	DP, SE, TP	DEC VAX 6320	14	1.64 (S), 1.64 (P)	21168 DH, 7.0 DC, 1.72 LP (actual)	73	32-128	5	300	10	HP-UX	Ethernet	300/150	32	$188,500 with 32M-byte memory, battery backup, access port	End user, OEM, VAR
	HP 9000 Model 855	June 1989	DP, SE, TP	IBM 4381, DEC VAX 6330	21	2.2 (S), 2.2 (P)	31,720 DH, 9.6 DC, 2.2 LP (actual)	36	32-128	5	400	12	HP-UX	Ethernet	400/180	32	$308,500 with 32M-byte memory, battery backup, access port	End user, OEM, VAR
	HP 9000 Model 935	Sept. 1988	DP, TP	IBM AS/400, DEC VAX 6310	6	NP	12 DC (actual)	67	48-96	NP	240	8	MPE XL	802.3 LAN	240/NP	32	$150,000 with 48M-byte memory, battery backup	End user, VAR
	HP 9000 Model 950	Sept. 1987	DP, TP	IBM AS/400, DEC VAX 6000	7	NP	15 DC (actual)	73	64-128	NP	400	15	MPE XL	802.3 LAN	400/NP	32	$305,000 with 64M-byte memory, battery backup	End user, VAR
	HP 9000 Model 955	May 1989	DP, TP	DEC VAX 6000, IBM 4381	11	NP	22.5 DC (actual)	40	96-192	NP	400	15	MPE XL	802.3 LAN	400/NP	32	$465,000 with 96M-byte memory, battery backup	End user, VAR
IBM **(800) 642-5449**	3090 Model 100S	March 1989	All	NA	NP	NP	NP	18.5	32-256	5	NP	16-32	MVS, VM, TPF, VSE	Both	NP/NP	32	$792,000 with CPU controller	NP
	4381 Model 21**	First quarter 1981	DP, SE, TP	NA	NP	0.47 (P)	0.47 LP, 0.47 LL	68	8-16	1	2	12	VM/HPO, VM/XA SP, MVS/SP1 or 2	Both	NP/NP	32	$248,900	NP
	4381 Model 22**	First quarter 1981	Same as above	NA	NP	0.97 (P)	0.97 LP, 0.83 LL	68	16-32	1	2	12	Same as above	Both	NP/NP	32	$313,200	NP
	4381 Model 23**	First quarter 1981	Same as above	NA	NP	1.31-1.7*** (P)	1.31*** LP, 1.13*** LL	52	16-64	1	2	12	VM/HPO, VM/XA SP, MVS/SP1 or 2, MVS/SP3 ESA	Both	NP/NP	32	$559,700	NP
	4381 Model 24**	First quarter 1981	Same as above	NA	NP	2.63*** (P)	2.6*** LP	52	16-64	1	2	24	VM/HPO, VM/XA SP, MVS/SP1 or 2	Both	NP/NP	32	$937,700	NP
	4381 Model 90E**	NP	NP	NA	NP	NP	1.3 LP, 1.13 LL	52	16-64	1	2	12	VM/HPO, VM/XA SP, MVS/SP1 or 2	NP	NP/NP	NP	$398,200	NP
	4381 Model 91E**	Sept. 1988	DP, SE, TP	NA	NP	1.31, 1.7*** (P)	1.3*** LP, 1.13*** LL	52	16-64	1	2	12	VM/HPO, VM/XA SP, MVS/SP1 or 2, MVS/SP3 ESA	Both	NP/NP	32	$498,200	NP
	4381 Model 92E**	NP	NP	NA	NP	2.63*** (P)	2.6*** LP	52	16-64	1	2	24	VM/HPO, VM/XA SP, MVS/SP1 or 2, MVS/SP3 ESA	NP	NP/NP	NP	$878,200	NP
	9377 Model 80	NP	NP	NA	NA	NA	0.58 LP	66.7	8-16	1	2	12	VM/SP, VM/IS, VSE/SP, AIX/370, DPPX/370, MUMPS/ VM, VMS/370	NP	NP/NP	NP	$149,100	NP
	9377 Model 90	NP	NP	NA	NA	NA	0.78 LP, 0.7 LL	50	8-16	1	2	12	Same as above	NP	NP/NP	NP	$209,400	NP

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPARABLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS[2])	PERFORMANCE (MFLOPS[3])	BENCHMARK[4]	MACHINE CYCLE TIME (nsec)	MEMORY RANGE (megabytes)	DISK TRANSFER RATE (megabyte/sec.)	NUMBER OF PORTS	NUMBER OF CHANNELS	OPERATING SYSTEMS	SUPPORTS ETHERNET OR TOKEN-RING	MAXIMUM NUMBER OF USERS/ TYPICAL NUMBER OF USERS	WORD LENGTH (bits)	BASE PRICE	DISTRIBUTION
Mips Computer Systems, Inc. **(408) 720-1700**	M/2000	Third quarter 1989	DP, SE	DEC VAX 8800	20	NP	3.9 LP, 47,400 DH (actual)	40	32-128	1.5-20	1-64	NP	Unix	NP	NP/NP	32	$110,000-$125,000 with 32M-byte memory, 2.6G-byte disk, 13 slots	OEM, VAR
National Advanced Systems **(408) 970-1000**	AS/EX 10	First quarter 1989	DP, SE	IBM 4381	4.7	NA	NA	20	32-256	3-6	NP	8-32	MVS, VM, MVS/ESA, MVS XA, VM XA	NP	NP/NP	32	$489,200	End user
	AS/EX 20	Second quarter 1987	DP, SE	IBM 4381	6.3	NP	2.2 LP, 1.9 LL (actual)	20	32-256	3-6	NP	8-32	MVS, VM, MVS/ESA, MVS XA, VM XA	NP	NP/NP	32	$560,200	End user
NCR Corp. **(513) 445-4168**	Tower 32/825	Second quarter 1989	DP, OA	NP	NA	NP	NP	33	8-128	1.5	NP	NP	Unix System V	Both	NP/NP	32	$165,000 with 32M-byte memory, 2.7G-byte disk, 150M-byte tape	End user, OEM, VAR
	Tower 32/850	Fourth quarter 1988	DP, OA	NP	NA	NP	NP	33	8-384	1.5	NP	NP	Unix System V	Both	512/NP	32	$315,000 with 64M-byte memory, 4.8G-byte disk	End user, OEM, VAR
	V-8800 series	NP	DP, TP	IBM 4381, 3090	1.5-12	NP	NP	38	4-64	1.5	16-256	NP	VRX	Both	NP/NP	32	$295,000-$2,199,000 with 4M- to 32M-byte memory, 1-8 processors, 16-32 channels	End user
	9800 XP, 9884, 9886, 9863, 9842, 9832, 9822	NP	DP, TP	IBM AS/400, 9370, 4381	2.5	NP	6.5-23.5 DC (actual)	56-145	4-192	1.5	1-139	NP	VRX/E	Both	NA/NA	32	$117,550-$344,390	End user
Nixdorf Computer Corp. **(617) 890-3600**	Targon 35 Models 50, 55	NP	DP, OA, SE	NP	6.5-19.5, 9-27	NP	NP	NP	16-128	NP	NP	NP	Unix System V	Ethernet	191/NP	32	$82,000-$400,000	End user
Prime Computer, Inc. **(508) 655-8000**	6350	May 1987	All	DEC 6000, IBM 3090	11.8	NA	NA	44	32-128	2.4	512	NA	PRIMOS	Ethernet	960/ 200-250	32	$556,600 with 32M-byte memory, 817M-byte disk, terminal	VAR
	6150	Aug. 1987	All	DEC 6320, 6000, IBM 4381	8.5	NA	NA	44	32-64	2.4	512	NA	PRIMOS	Ethernet	960/ 150-200	32	$451,000 with 32M-byte memory, 817M-byte disk, terminal	VAR
	4450	Aug. 1988	All	DEC 6320, IBM AS/400	5.8	NA	NA	64	32	2.4	256-512	NA	PRIMOS	Ethernet	600/ 100-150	32	$290,700 with 32M-byte memory, 496M-byte disk, terminal	VAR
	4150	Feb. 1988	All	DEC 6000, IBM AS/400	4.1	NA	NA	77	24-32	2.4	256-512	NA	PRIMOS	Ethernet	960/ 65-75	32	$191,600 with 24M-byte memory, 496M-byte disk, terminal	VAR
	Prime EXL 1281, 1227	1989	DP, OA	IBM 3090, DEC VAX 6000 and 8000	Up to 120	NP	NP	62.5	8-240	2.4	256	8.2	DYNIX 3.0	Ethernet	1,000/ 300, 100	NP	$200,000, $120,000	End user, VAR
Pyramid Technology Corp. **(415) 965-7200**	MIS-1, 1E, 2, 4, 12	June 1989	DP, TP	DEC VAX 8800, 6000, IBM 9370	14-140	7.1 (S), 12.5 (P)	47,000 DH, 3.8 LP, 4.2 LL (actual)	100	8-256	2.4-11	512	16	OSX	Ethernet	1,000/ 100-200	32	$108,000 with 32M-byte memory, power supplies	End user, OEM, VAR
Sequent Computer Systems, Inc. **(503) 626-5700**	Symmetry S81	Sept. 1987	NP	IBM 3090	8-120	0.26 (S), 0.45 (P)	100 DC (estimated), 5395 DH, 0.262 LP (actual)	62.5	8-240	1.5	256	2-10	DYNIX	Ethernet	1,000/ 100-300	32	$184,000 with 16M-byte memory, 2 CPU, 264M-byte disk, 16 ports	End user, OEM, dealer
Sequoia Systems, Inc. **(508) 480-0800**	Series 300	Feb. 1989	TP	IBM 4381, DEC VAX 6000	4-64	NP	20-64 DC (actual)	NP	2G	NP	1,000	200	TOPIX	Ethernet	1,000/ 500	NP	$300,000	End user, OEM, dealer, VAR
Stratus Computer, Inc. **(508) 460-2000**	Stratus XA2000 Models 110-160	Jan. 1987	TP	IBM System 88	NA	NA	14-67 DC (actual)	62.5	8-96	2.45	448	8	VOS	Ethernet	NP/NP	32	$170,000-$750,000 with 8M- to 32M-byte memory, 1-6 processors	End user, OEM, VAR
	Stratus XA2000 Model 70	Oct. 1987	TP	IBM System 88	NA	NA	10-12 DC (actual)	62.5	8-16	2.45	112	2	VOS	Ethernet	NP/NP	32	$110,000	End user, OEM, VAR
Tandem Computers, Inc. **(408) 725-6000**	Nonstop CLX 720, 740, 760, 780	1989	TP	IBM AS/400	1.5-12	NP	NP	90	16-128	1.2	6-816	NP	Guardian 90	NP	6-816/ 50-300	32	$105,000 with 2 CPUs, 16M-byte memory, two 300M-byte disks, 128M-byte tape drive	End user
	Nonstop VLX302E, 304E	April 1986	TP	IBM 4381	Up to 90	NA	NP	83.3	192-384	1.2-1.8	NP	Up to 32	Guardian 90	Ethernet	NP/NP	32	$560,000 with 2 CPUs, 16M-byte memory, 1.1 G-byte disk, tape drive	End user
Unisys Corp. **(215) 542-4011**	U6000/70	July 1989	DP, TP	AS/400, DEC VAX 6000	NP	NP	NP	100	8-80	3	96	NA	Unisys System V	Ethernet	200/ 80-120	32	$110,000 with 16M-byte memory, 2 CPUs, tape, disk	NP
	U6000/80	July 1989	DP, TP	AS/400, DEC VAX 6000	NP	NP	NP	100	8-240	3	256	NA	Unisys System V	Ethernet	400/100	32	$195,000 with 16M-byte memory, 2 CPUs, tape, disk	NP
	A 4-FX; A 6-FX; A 6-KX	Nov. 1988	DP, TP	IBM 9370, AS/400	NP	NP	NP	NP	12-48, 24-96	3.4, 4.5	NA	1-24, 1-32	MCP/AS	Ethernet	NP/NP	48	$65,000 and $115,000 (12M-byte memory, 1 CPU), $210,000 (24M-byte memory, 2 CPUs)	NP
	A 12B	March 1989	DP, TP	IBM 4381	NP	NP	NP	65	24-72	3	NP	32-48	MCP/AS	Ethernet	NP/NP	48	$495,000 with 24M-byte memory, CPU	NP
	A 10-DX, FX, HX	Sept. 1986	DP, TP	IBM 4381, 3090	NP	NP	NP	72.5	12-24, 12-48, 24-96	3	NA	15-40, 25-80	MCP/AS	Ethernet	NP/NP	48	$328,000 and $464,000 (12M-byte memory, 1 CPU), $770,000 (24M-byte memory, 2 CPUs)	NP
	V310 Model 2	June 1986	DP, TP	IBM 9370, AS/400	NP	NP	NP	110	10-20	3	NA	16-32	MCP/VS	NA	NP/NP	40	$126,000 with 10M-byte memory, CPU	NP
	V340	Nov. 1985	DP, TP	IBM 9370, AS/400	NP	NP	NP	110	10-40	3	NA	24-32	MCP/VS	NA	NP/NP	40	$205,000 with 10M-byte memory, CPU	NP
	V380	Oct. 1985	DP, TP	IBM 9370, AS/400	NP	NP	NP	110	10-40	3	NA	24-64	MCP/VS	NA	NP/NP	40	$365,000 with 10M-byte memory, CPU	NP

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPARABLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS[2])	PERFORMANCE (MFLOPS[3])	BENCHMARK[4]	MACHINE CYCLE TIME (nsec)	MEMORY RANGE (megabytes)	DISK TRANSFER RATE (megabyte/sec.)	NUMBER OF PORTS	NUMBER OF CHANNELS	OPERATING SYSTEMS	SUPPORTS ETHERNET OR TOKEN-RING	MAXIMUM NUMBER OF USERS/ TYPICAL NUMBER OF USERS	WORD LENGTH (bits)	BASE PRICE	DISTRIBUTION
Unisys Corp. **(215) 542-4011**	System 80 Models 10, 15, 20	July 1987, Oct. 1988 (Model 15)	DP, TP	IBM AS/400, 9370	NP	NP	NP	100, 108 (Model 20)	2-8, 4-12, 4-16	2.2	NA	1-6	OS/3	Ethernet	NP/NP	32	$94,000 (2M-byte memory), $130,000 and $178,000 (4M-byte memory) with CPU	NP
	2200-201, 202	Dec. 1986	DP, TP	IBM AS/400, 9370	NP	NP	NP	108	8-48	3	NA	1-28	OS/1100	Ethernet	NP/NP	36	$110,000 (4M-byte memory, 1 CPU), $174,000 (8M-byte memory, 2 CPUs) with two 380M-byte disks	NP
	2200-203, 204	Oct. 1987	DP, TP	IBM AS/400, 4381	NP	NP	NP	108	8-48	3	NA	1-28	OS/1100	Ethernet	NP/NP	36	$262,000 (3 CPUs), $320,000 (4 CPUs) with 8M-byte memory, two 380M-byte disks	NP
	2200-401, 402	March 1989	DP, TP	IBM 4381; 3090 (Model 402)	NP	NP	NP	80	16-64	3	NA	4-64	OS/1100	Ethernet	NP/NP	36	$192,000 (1 CPU), $638,000 (2 CPUs) with 16M-byte memory	NP
	2200-403	Aug. 1989	DP, TP	IBM 4381, 3090	NP	NP	NP	80	16-64	3	NA	4-64	OS/1100	Ethernet	NP/NP	36	$475,000 (3 CPUs), $638,000 (4 CPUs) with 16M-byte memory	NP
Wang Laboratories, Inc. **(508) 459-5000**	VS 10000, Models 50,75,100	Dec. 1988	DP, OA, TP	IBM 4381, 3090	NP	NP	NP	44	32-256	3	NP	30	VS OS, Unix	Ethernet	1,012/ 100-150	32	$420,000 with 32M-byte memory	End user, VAR

Midsize vendors

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Corp. in Framingham, Mass., sees the Apollo division of HP and other firms gambling on "open systems," while firms such as DEC, IBM and Unisys continue hedging their bets by offering both proprietary and RISC-based architectures.

For HP and Apollo, the strategy seems to be paying off. HP's overall computer business is growing at better than 20% per year, while DEC struggles to stay at more than 10%, Herwick notes.

HP currently holds 6% to 8% of the market, according to Computer Intelligence, a La Jolla, Calif.-based market researcher. In the past year, the company has managed to move 80% of its 3000 system users to its new RISC-based operating system, Aberdeen's Logan says.

DG is also a good example of the trend toward RISC systems, Bellomy says. Although it has struggled with mounting financial woes and work-force cuts, the company took its RISC plunge early this year with a series of Unix-based workstations based on Motorola, Inc.'s 88000 RISC chip. In late May, DG, which Annex Research estimates holds about 4% of the intermediate-systems market, offered preconfigured models for its Eclipse MV/15000.

Fighting the tide

Swimming against the RISC tide was Wang Laboratories, Inc., which last February unveiled its high-end VS10000 midrange system. A month ago, the Lowell, Mass.-based company expanded its proprietary VS product line with the VS8000 machine, additional software and peripherals.

But severe financial troubles are haunting Wang, with losses last year of $424 million and layoffs of thousands of employees.

Overall, the industry's product mix is shifting toward smaller, faster and cheaper machines, so turning a profit gets tougher all the time, financial analyst Walker notes.

Rising inventories and falling demand for minis are plaguing companies such as Unisys, which last month announced staff cutbacks and a "top-to-bottom" operations review.

"They're pushing products as fast as they can out the door, playing beat the clock," Walker says. T[illegible] include a fifth Unix offering, in a deal with Sequent Computer Systems, Inc., and three new models of its U6000 series of Unix machines.

Tandem Computers, Inc. added four high-end models to its Nonstop CLX 700 series of midrange on-line transaction processing (OLTP) systems. Ranging from two to eight processors, the new models, priced from $105,000 to $405,000, present escalating competition for DEC in the OLTP market.

Even though its media prominence in the past year was due to takeover wars rather than hardware innovations, Prime Computer, Inc. introduced the 2850 model to its Unix-based Series 50 line.

In turning to RISC and Unix, many medium-scale vendors are trying to sort out a long-standing identity problem. In many respects, midrange computers have always been caught between mainframe functionality and desktop price/performance, IDC's Bellomy says.

These days, some analysts see that identity confusion turning into a market crisis.

"I think minicomputers are becoming an endangered species," says Bob Djurdjevic, president of Annex Research. "The distinction between workstations and the midrange is beginning to blur."

Djurdjevic's theory is that the spectacular sales of the AS/400 have temporarily propped up a moribund midrange market. Annex Research put AS/400 shipments at 11,200 in the U.S., worth $1.1 billion.

Pent-up demand for the long-awaited AS/400 was largely responsible for the enormous response: 25,000 shipped three months after its August 1988 debut. But it remains to be seen whether AS/400 installations will bring in much new business for IBM.

DEC dazzles

Other industry watchers see tangible signs of life among intermediate systems in DEC's dizzying array of product rollouts. The $12.7 billion company unveiled three different generations of microprocessors during the past 18 months, fleshing out its 6000 series and adding serious RISC competition for its own VAX line.

DEC makes no bones about its intention to stay competitive among medium systems. The company spent millions this past summer retraining a sales force confused about its strategy and product positioning. Also, as IBM did two years ago, DEC is trimming overhead costs and shifting thousands of its employees from manufacturing positions to sales and services.

Michael Geran, an industry analyst at Nikko Securities Co. International, Inc. in New York, sees a slowdown in market growth and conservative purchasing as key trends in the current medium-scale market.

Slower growth and movement toward safe-bet vendors, however, do not necessarily mean the market is either dying or dull.

"I believe that as the market keeps changing, the minis will be used in different aspects: as servers or high-end machines connecting other machines," says Alea Fairchild, an analyst at Dataquest, Inc. in San Jose, Calif. "All those workstations and supercomputers in the world have to connect to something." •

Memorable moments

December: IBM announces 25,000 Application System/400s have shipped. DEC confirms that the VAX 8600 will be phased out in 1989.

January: DEC announces its assault on the desktop, including the Decstation 3100, its first RISC-based system.

April: IBM shows it will not give up on the 9370, offering a low-end 9370 and enhanced 9370 Model 50.

May: Wang's 2200 series, its original multiuser system, is turned out to pasture after 17 years and replaced with a 386-based product line.

June: The AS/400 is 1 year old.

July: With the introduction of the 6000 series, DEC effectively replaces the 8000 series while expanding its RISC offerings. Unisys announces plans to develop a Motorola, Inc. 88000-based server. Hewlett-Packard Co. announces plans to license its RISC technology to other vendors.

August: Wang hits the wall, as its ongoing fiscal woes result in a $424.3 million loss in the fiscal year 1989 and the subsequent resignation of president Fred Wang.

Front ranks take heavy hits

BY GARY SMABY

This is drama worthy of the tabloids. Within a one-month span last spring, both of supercomputing's aging pioneers suffered midlife crises, which eventually left one company dead and the other divided. The still-fledgling industry has yet to recover from these traumatic events.

The first veteran to succumb was Control Data Corp.'s ETA Systems subsidiary. In 1983, ETA emerged from the ashes of CDC's unsuccessful Cyber 205 effort and reentered the market with a grand vision of recapturing ground lost to its crosstown rival, Cray Research, Inc.

But ETA fell far short of that objective. In fact, despite considerable effort, ETA never displaced a single Cray. This lack of success left the company in the red, creating a serious financial burden for its parent. Given CDC's own precarious financial health last spring, major surgery was clearly needed. The popular speculation was that ETA would be sold, so most pundits were shocked when CDC resorted instead to euthanasia.

In retrospect, the venture was probably doomed from the outset. ETA had courted failure by attempting to pioneer too many technology frontiers at once. The ETA-10 design incorporated liquid nitrogen cooling, high-density custom CMOS circuits, multilayer printed-circuit boards and automated manufacturing.

> UNDER PRESSURE to show early sales, ETA accepted contracts before the promised system software features were deliverable.

Lack of technological prowess was not one of ETA's shortcomings; it came close to achieving many of its targets. Instead, it was tripped up by comparatively simple challenges, such as basic system design and software development.

For starters, the decision to pattern the ETA-10 after the less than popular CDC Cyber 205 supercomputer was ill-conceived. ETA's designers unwittingly carried genetic defects from one generation to the next. And like its predecessor, the ETA-10 architecture proved to be a programmer's nightmare, which made it difficult to entice third-party software vendors to port to the new machine.

Under pressure to show early sales, ETA accepted several contracts before most of the promised system software features were deliverable; sales efforts stalled at the high end. In response, management shifted marketing focus to the entry level. ETA hastily repackaged a smaller, yet compatible air-cooled version of the ETA-10. But user needs in the entry-level market turned out to be radically different from those at the top end.

Belatedly, the company scrambled to add Unix as a second operating system. But this ill-fated effort merely stretched its already thin resources. ETA was simply not able to support two operating systems and did not choose between them.

SPECIAL-PURPOSE SYSTEMS

In the end, ETA did not fail for lack of capital or market potential; neither can its downfall be blamed on competitive pressures or inferior technology. Rather, key errors in strategic planning undermined an otherwise promising business plan.

ETA's fall merely served as a prelude to troubles elsewhere in the industry. Barely a month later, granddaddy Cray Research rocked the industry with its decision to cut loose its founder and industry guru, Seymour Cray, and his much heralded Cray-3 development project.

Many observers initially concluded that the split was forced by a combination of external pressures — namely, Japanese competition, Wall Street nearsightedness and shortage of research and development dollars.

However, the issue behind the divorce can be traced to internal causes. Differences between Cray's management and the company's namesake erupted over product strategy. This unfortunate collision resulted from an earlier Cray Research decision to concurrently fund two costly advanced development projects: the C-90 and the Cray-3.

Cray Research initiated the C-90 project as an evolutionary path for production-oriented commercial users favoring the X-Y architecture. The Cray-3 was to be a breakthrough machine designed to leverage off Cray Research's research-oriented predecessor, the Cray-2.

At the start, Cray Research management believed that the two projects would be separated in both chronology and performance. Original plans called for the Cray-3 to reach the market at least two years ahead of the C-90.

But as both projects progressed, it

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Smaby, president of the Smaby Group, Inc., a Minneapolis-based technology research/consulting firm, is a senior advisor to Needham & Co., a New York-based investment banking firm.

Superminis making moves behind the scenes

BY ELLIS BOOKER

SPECIAL-PURPOSE SYSTEMS

Much of the action in the fast-evolving supercomputing industry in the past 12 months has taken place in the boardrooms of supercomputer companies. But while attention has been riveted on the fortunes of Control Data Corp. and the now-cleaved Cray Research, Inc. (see story previous page), companies such as Convex Computer Corp., Alliant Computer Systems Corp. and Thinking Machines Corp. have staked out their own segment of the high-performance computer marketplace.

While these minisuper vendors have not grabbed the widely publicized government contracts of the sort that sustain market leader Cray, the unit price of their equipment ($100,000 to $1 million) is far lower and therefore potentially more appealing to commercial customers.

On the other hand, with the exception of Convex, the market is composed of relatively small players with brief corporate histories, giving some buyers pause.

That hesitation could end with the introduction of a vector processing minisupercomputer from Digital Equipment Corp., expected this month or next. Details about the DEC 9000 are sketchy, but analysts say they believe the machines will go head-to-head with the Convex product line.

"DEC's entry will legitimize the market," says Debra Goldfarb, a technical computing analyst at International Data Corp. (IDC) in Framingham, Mass. Goldfarb, who along with other analysts says DEC is targeting Convex with its new line, projects that DEC will outpace Dallas-based Convex in revenue and units shipped within this market by 1990.

Last year, minisupercomputer market leader Convex posted revenue of $105.6 million, and its net profits in the second quarter, ended June 30, were up more than 108% from the year before.

Leaps and bounds

IDC figures show worldwide revenues for the high-performance mainframe market growing from $4.5 billion in 1988 to $5.8 billion in 1993; supercomputers are growing from $825 million last year to $1.3 billion in '93; and minisupercomputers are increasing at a whopping compound annual growth rate of 36%, growing from $251 million last year to $1.19 billion by '93.

But Goldfarb believes the minisupercomputer category itself may be overtaken by increasingly powerful workstations from firms such as Silicon Graphics Corp. and Stardent Computer, Inc. — the expected merger between Ardent Computer Corp. and Stellar Computer, Inc. At the same time, new high-end products from Convex and the rumored DEC 9000, designed to compete with the low end of the traditional supercomputer market, will blur existing definitions of where a minisuper ends and a supercomputer begins.

The newest entrant on the minisuper block recently came from Evans & Sutherland Computer Division, which introduced its ES-1 in July.

The ES-1, described by its manufacturer as a "moderately parallel" computer, can be configured with two to eight parallel processors with 16 computational units (CU) per processor. Each CU contains three functional units and is equivalent to a minisupercomputer or mainframe, according to Evans & Sutherland.

While rejecting the massive parallelism of Thinking Machines' 64,000-processor Connection Machine, Evans & Sutherland also avoided vector processors, arguing that peak performance can be achieved only if most of the code has been vectored.

Thinking Machines itself attempted to capture a wider audience by introducing scaled-down versions of the Connection Machine. The CM-2A machines, available in 4,092- and 8,192-processor models, are priced at $500,000 and slightly more than $1 million, respectively.

Minisupers are often characterized by parallel processing architectures. But many analysts warn there may be an unpleasant genie waiting for users trying to move applications between traditional supercomputers and minisupers. Compatibility across systems using different levels or "granularities" of parallel processing will be an issue, they warn.

But independent San Franscisco analyst Jeff Canin believes there is "a wider acceptance of parallel processing, including the more exotic architectures," although he admits that compatibility issues may surface when users begin trying to move between levels of parallelism.

The numbers look good for the

Continued on next page

Booker is *Computerworld's* Chicago correspondent.

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Front ranks

CONTINUED FROM PAGE 84

became clear that the paths were converging on the same target. Development snags caused the Cray-3 program to slip more than a year behind schedule, while the C-90 project was running well ahead of plan.

Caught on the horns

Cray Research had unwittingly created a classic marketing dilemma. The company was funding two virtually identical programs, targeting the same price point, performance range, customer set and launch date. The situation was both costly and divisive. After an agonizing review process, management concluded that the troubled Cray-3 project would have to go.

The divorce settlement reached between the two parties was probably the least damaging option available. With its one-time payment, which provides the new Cray Computer Corp. with roughly $150 million in cash and assets to complete its first working prototype, Cray Research avoided a potentially bitter breakup. After that, Seymour Cray's new venture will be on its own.

The departure of the company's founder, while crippling, will not be fatal to Cray Research. Over the years, the company brought in dozens of top-notch engineers and designers. Given this depth, the company will be able to weather Seymour Cray's departure much better than it could have in its early years.

Cray Research is well-entrenched in a loyal installed base. The company has an array of competitive products to carry it to the next generation. The company's new flagship product line, the Y-MP, has been well received.

But the recent catharsis has taken its toll. In 1989, Cray Research will likely post a decline in sales and earnings for the first time in its 13-year history. Single-digit growth may be the best it can hope for next year.

Little is known about plans for Seymour Cray's new venture, Cray Computer. It is a fact that the Cray-3 development is now at least a year behind schedule, but Seymour Cray remains confident that a working prototype of the process or module assembly will be operational by year's end.

The Cray-3 design incorporates almost 50,000 logic chips to achieve peak performance of about 16 billion floating-point operations per second — eight to 10 times faster than the Cray-2.

The greatest challenge for the new machine is manufacturability. The Cray-3 and its follow-ons will depend on manufacturing technology so advanced that most of the assembly equipment will have to be either heavily modified or designed from scratch.

Cray is expected to hand-assemble a few Cray-3 preproduction prototypes in 1990. These will likely be smaller, four-processor configurations for internal and sophisticated government use.

If the machine lives up to its billing, Seymour Cray may have dozens of loyal followers standing in line to buy one, and Cray Research could be the loser. By early 1990, Cray Research will be at full stride with its Y-MP product line, the survivability of the next wave of upstarts will be more apparent, the Japanese will have revealed their new offering, and ETA will be just a memory. •

Superminis

CONTINUED FROM PAGE 85

minisuper vendors. IDC estimates that they will account for 13% of the $9 billion worldwide high-performance computer market by 1993. The once-high expectations have been trimmed for the projected market for high-end supercomputers.

Analysts note that the breadth of the supercomputer market may be smaller than expected. "It now seems that the market for $25 million supercomputers is relatively finite in size," Hingorani suggests. He adds, however, that he does not think the market is saturated.

Japanese companies seem to agree that there is room to expand into the U.S. marketplace. Analysts note that Japanese players Hitachi Ltd., NEC Corp. and Fujitsu Ltd. will continue to seek a foothold in the U.S. The Japanese have demonstrated steady improvements in hardware, and a number of analysts say it is only a matter of time before they improve their software skills.

Analyst Canin believes that the Japanese are, for now, targeting only the top echelon of the supercomputer market.

"For the next two to three years, Japanese competition with domestic minisuper suppliers will be nonexistent," Canin says. He notes, however, that the distinction between minisupers and supercomputers is not that clear, and so some entry-level Japanese models may affect this market. He also says that the leading U.S. minisuper suppliers, Convex and Alliant, have done well overseas.

But Canin wonders whether the second-tier minisupercomputer players will have the stamina for the future. What the demise of ETA Systems and the splitting of Cray indicate, he says, is that "the [cost of R&D] investment continues to accelerate, and there is some question whether the smaller players can compete."

The minisuper companies, facing the Japanese on the one hand and high-end workstations on the other, have a brief window of opportunity. Like supercomputer makers in general, they will have to convince a broader audience of the advantage of added processing power. •

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For a copy of the complete contest rules, or a list of winners, send a self-addressed stamped envelope to Communication Networks '90, P.O. Box 9171, Framingham, MA 01701.

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1. ____________________
2. ____________________
3. ____________________
4. ____________________
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Special-purpose systems

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPARABLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS[2])	PERFORMANCE (MFLOPS[3])	BENCHMARK[4]	MACHINE CYCLE TIME (nsec)	MEMORY RANGE (megabytes)	DISK TRANSFER RATE (megabyte/sec.)	NUMBER OF PORTS	NUMBER OF CHANNELS	OPERATING SYSTEMS	SUPPORTS ETHERNET OR TOKEN-RING	MAXIMUM NUMBER OF USERS/ TYPICAL NUMBER OF USERS	WORD LENGTH (bits)	BASE PRICE	DISTRIBUTION
Alliant Computer Systems Corp. **(508) 486-4950**	FX/40	May 1985	SE	DEC VAX 8800, IBM 3090	NP	32.6 (S), 94.4 (P)	5.3-6.8 LP (actual)	170	128	NP	16-128	6	Unix	Ethernet	32	64	$149,000	End user, OEM
	FX/80	May 1985	SE	DEC VAX 8800, IBM 3090	NP	70 (S), 188.8 (P)	8.5-10.9 LP (actual)	170	256	NP	Same as above	12	Unix	Ethernet	64	64	$299,000	Same as above
	FX/82	May 1985	SE	DEC VAX 8800, IBM 3090	NP	377.6 (P)	NP	170	512	NP	Same as above	24	Unix	Ethernet	128	64	$1,250,000	Same as above
	VFX/40	Sept. 1988	SE	DEC VAX 8800, IBM 3090	NP	32.6 (S), 94.4 (P)	5.3-6.8 LP (actual)	170	128	NP	Same as above	6	Unix	Ethernet	32	64	$200,000	Same as above
	VFX/80	Sept. 1988	SE	DEC VAX 8800, IBM 3090	NP	70 (S), 188.8 (P)	8.5-10.9 LP (actual)	170	256	NP	Same as above	12	Unix	Ethernet	64	64	$350,000	Same as above
Convex Computer **(214) 497-4000**	C210-C240	Sept. 1984	SE	IBM 3090-200E VF	56-224	44-166 (S), 50-200 (P)	18-30 LP	40	64-2000	2-6	NP	NP	Unix	Ethernet	512/ 100	64	$300,000	End user, dealer
Cray Research, Inc. **(800) 234-3401**	Cray Y-MP	Nov. 1988	SE	NA	NP	1200-2200 (S), 2700 (P)	195-262 LP (actual)	6	128-1024	9.6	78	18	Unicos, COS	Ethernet	NP/ 1,000	64	$23,700,000 with 128M-byte memory, 48 disk ports, 16 tape channels	End user, OEM
Evans & Sutherland Computer Div. **(415) 962-1295**	ES-1 Supercomputer Series	Fourth quarter 1989	SE	NP	1600	1600 (P)	1320 LP, 184 LL (estimate)	40	256-2048	12	NP	16-64	ESIX	Ethernet	NP/ 2,400	64	$2,200,000 with 256M-byte memory, tape drive	End user
Floating Point Systems, Inc. **(503) 641-3151**	FPS M64/165	1981	SE	IBM 3090	31	942 (S) 1173 (P)	7.55 LP, 5.8 LL (estimates)	52.6	8-128	12	NP	6	SJE	Ethernet	NP	64	$370,000 with 8M bytes memory	
	FPS 5800	NP	SE	NP	NP	36-65 (S) 48-102 (P)	NP	41.7	10	Up to 12	NP	NP	Proprietary	NP	1/NP	38/64	NP	NP
	Midrange Super-computer Model 500	Feb. 1, 1989	SE	IBM 3090 VF	133	150 (S), 167 (P)	24.2 LP, 5.2 LL (actual)	30	16M-1G	6	2	8	FPX (Unix System V, Release 3)	Ethernet	128/64-128	64	$190,000 with 16M-byte memory, 2 I/O ports	End user, OEM, VAR
	Super-computer Model 300	May 1988	SE	NP	35	40 (S), 60 (P)	10.5 LP (actual)	50	256	24	NA	4	Stellix	Ethernet	100/15	512	$106,700 with 32M-byte memory, 150M-byte tape drive, console, 4 ports	OEM
Multiflow Computer, Inc. **(203) 488-6090**	7/200, 7/300, 14/300, 28/300	Jan. 1987	SE	NP	53-215	22-69 (S), 30-120 (P)	9-20 LP, 4.2-6 LL (actual)	130	32-512	20	96	2	Trace/Unix, BSD 4.3	Ethernet	96/64	NP	$299,500	End user
Sharebase Corp. **(408) 378-7000**	Server/ 8000	1988	All	NA	NA	NA	NA	NA	16-256	3	6-48	6	Relational Database Operating System	Ethernet	NP/ 1,000	32	$363,000-$548,000 with 16M-byte memory, 2G-byte disk, Sharebase II software	End user, OEM
	Server/700	1981	DP, OA, TP	NA	NA	NA	NA	NA	6	3	4-56	1-7	Relational Database Operating System	Ethernet	NP/ 100+	16	$195,000-$280,000 with 6M-byte memory, 2G-byte disk, Sharebase I software	End user, OEM
	Server/300	1985	All	NA	NA	NA	NA	NA	4	1.8	2-32	1-4	Relational Database Operating System	Ethernet	NP/30	16	$45,000-$136,000 with 4M-byte memory, 830M-byte disk, Sharebase I software	End user, OEM, VAR
Thinking Machines Corp. **(617) 876-1111**	Connection Machine CM-2	Aug. 1987	SE	NA	2500	4000 (S), 14,000 (P)	NP	NP	128M-2G	100	NP	NP	Unix/Ultrix	Ethernet	NP	NP	$1,000,000 with 16K-, 32K-, 64K-byte CPUs	End user
	Connection Machine CM-2A	June 1989	SE	NA	2500	4000 (S), 14,000 (P)	NP	NP	128M-2G	100	NP	NP	Unix/Ultrix	Ethernet	NP	NP	$500,000 with 4K-, 8K-byte CPUs	End user
Teradata Corp. **(213) 827-8777**	DBC/1012 Data Base Computer	Dec. 1984	DP, TP	IBM 3090	3000	NP	1174 TPS (actual)	50	6-4000	3	1-500	1-500	SQL	Ethernet	100+/ 10-50	32	$1,700,000-$2,000,000 with 22 CPUs	End user

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[1] DP = Commercial data processing; SE = scientific/engineering; TP = on-line transaction processing; OA = office automation.
[2] Millions of instructions per second.
[3] Full-precision millions of floating-point operations per second; S = sustained; P = peak.
[4] Per-second performance ratings, based on the following industry-standard benchmarks: DH = Dhrystone Version 1.1 (peephole optimization only); DC = Debit/Credit (transactions based on 95% subsecond responses); LP = Linpack (100 x 100 full-precision in MFLOPS); LL = Livermore Loops (harmonic mean; 14 loops). Vendors supplied either actual or estimated benchmark figures.

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

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Slaying the IS dragon with outsourcery

The service bureau approach to DP makes a comeback — with a twist

BY ALAN G. HAMMERSMITH

The most cost-effective way to manage your company's data center may be to let someone else do it.

As American business undergoes tumultuous changes and the use of information systems matures, many corporate executives are finding that their IS departments are like fire-breathing dragons: unapproachable monsters that hoard piles of treasured data and require extremely cautious management.

Gradually, but with increasing certainty, some of these executives are concluding that the promised productivity, which was their reason for investing in information technology in the first place, will not materialize unless drastic measures are taken. To that end, some have discovered the option of outsourcing major portions of their IS functions. On the vendor side, even IBM has entered the outsourcing market.

Outsourcing is being seriously considered in more and more organizations as a potential solution to rising IS costs. An IS manager who anticipates the need for a budget increase and whose organization fits the description of a good candidate for outsourcing would do well to study the financial and organizational benefits of adopting the trend.

The pressures for outsourcing are considerable and on the increase. Requirements to service large amounts of debt have made every department the subject of intense cost reductions. Also, competitive pressure from around the world is creating a restructuring of business and demanding the integration of processes.

These external pressures are combining with powerful internal pressures to create rapid change. Companies are questioning the value of their computer investments. Many are tired of spending millions on hardware and software that may be obsolete the next year. They are not convinced that they are making the best use of existing equipment, nor are they sure that they have the right equipment or people.

Furthermore, many IS organizations are having trouble keeping up with the pace of technological change. It is difficult to acquire, maintain and afford the highly skilled people required in today's mainframe computer operations. The pressures of reduced budgets are adding fuel to an already raging fire.

Outsourcing can help ease these problems in several ways. In the past, outsourcing was available in the form of such specialty applications as payroll, insurance processing, credit cards and mailing lists and was offered by service bureaus.

Today, however, the outsourcing of not only specialty applications but also entire IS functions is becoming increasingly popular.

The most recent increase in service bureau-type activity has occurred in data center outsourcing, in which in-house data centers are turned into remote

MARK STEELE

Hammersmith, a principal at A. T. Kearney, Inc. in its New York office, consults with executives on improving the effectiveness of information systems organizations.

- **Giving up control of the nitty-gritty details**
- **When cost-cutting gets overwhelming**
- **Aiding migrations, mergers and acquisitions**

job-entry operations, and the mainframes are owned and operated off-site by a remote computer service company. Some increase in activity has also occurred in the facilities management arena. Facilities management is a type of outsourcing in which a firm takes over on-site management of a data center. The outsourcer in this case brings in some of its own people and keeps some of the client's staff, and it maintains the data center as it is set up at the customer location.

As indicated, much of what is fanning the fire for the return to outsourcing is that business is having to restructure to remain competitive.

Assuming this, it is necessary that IS know — and support — what restructuring entails. Understanding today's business environment is a prerequisite to developing tomorrow's vision. IS executives who do not understand their company's business cannot keep pace with the changes in their business environment; nor can they create the changes needed during the restructuring process.

The two critical factors for successful restructuring are a willingness to recast the business processes in such a way that they are integrated and performed for the enterprise as a whole and an understanding that computer technology can be used to enable, not hinder, the changing processes. One task cannot be accomplished without the other.

Data center outsourcing alone cannot solve these problems, but it can provide IS some time to focus on the business issues. By outsourcing day-to-day operations, the IS organization hands over responsibility for the nitty-gritty details and thus gains at least some time to keep pace with the changing business environment.

The IS organization is a business within a business and should be run like a business. Effort should be spent on tasks beneficial to the business; therefore, the structuring of priorities is critical. Outsourcing may become one way of restructuring IS priorities.

Contributing factors

There are other factors that contribute to the growing use of outsourcing. Although the combination of factors may differ from company to company, the primary motivation is most often the pressure to reduce cost. The major cost-oriented factors include the following:

- **Increasing costs of mainframe environments.** The hardware, software and staffing costs required to operate a mainframe organization are becoming more expensive and attracting senior management's attention. Large outlays for capital and expenses are being more closely scrutinized.
- **Profit pressures.** Reduced profits and the pressure to cut costs are causing management to look everywhere to increase margins. The IS function is no longer off-limits to severe cost-cutting attacks.
- **Higher level IS executives.** Many companies now have senior executives managing the IS function. These executives most often run their operations as a business instead of as a data processing shop, and this view opens up alternatives — such as outsourcing — not previously accepted by information systems. The IS outsourcing decision has thus become an acceptable alternative.
- **Increased debt.** Leveraged buyout activity, and its large debt structure, has been a major reason for cutting costs in the IS area, thus supporting the use of outsourcing when costs can be reduced, avoided or delayed.
- **Mergers and acquisitions.** Outsourcing has been effectively used to create a temporary home for the computer

Who's offering it?

A partial list of data center outsourcing vendors

Boeing Computer Services
Vienna, Va.
703-821-6000

Comdisco Computing Services
Carlstadt, N.J.
201-896-2015

Compusource
Cary, N.C.
919-469-3325

Computer Task Group
Buffalo, N.Y.
716-887-7270

Financial Technologies, Inc.
Chantilly, Va.
703-631-4313

GE Information Services
Rockville, Md.
800-433-3683

Genix Enterprises, Inc.
Pittsburgh, Pa.
800-874-3649

Information Network Corp.
Dallas, Texas
214-580-1006

Litton Computer Services
Woodland Hills, Calif.
800-752-6527

May & Speh, Inc.
Downers Grove, Ill.
312-964-1501

McDonnell Douglas Computer Services
New York, N.Y.
212-267-8000

Recruit, USA
New York, N.Y.
212-750-6100

Sungard Computer Services
Philadelphia, Pa.
215-351-1300

SOURCE: A.T. KEARNEY, INC — CW CHART: DOREEN DAHLE

ATTACHMATE — Extra! SNA 3270 API, HLLAPI, SRPI

BARR SYSTEMS — HASP, SNA Remote Job Entry, SNA 3270

BLACK BOX — BSC, DIAL, SNA 3270, SNA 3770, SNA 5251

cfSOFTWARE — pcMAINFRAME

BLAST — XENIX, UNIX, DOS

CQ COMPUTER COMMUNICATIONS — CQ-327OR-4

CTI-COMMUNICATIONS — 3780FAST

CPAID — Master Tax/ Electronic Tax Filing

D3 SOFTDESIGN — Sync Tax, BSC 3780, Sync-Claim

EASTHAM & ASSOCIATES — UNISYS Basic Emulation

EMERALD TECHNOLOGIES — 3X Mate 3X Mate UNIX

FORETELL — ESP II, EDI FACT

MICRO INFORMATION SYSTEMS — ECS Electronic Claims System

NETWORK SOFTWARE ASSOCIATES — Remote-talk, ADAPTSNA, 3270 V4, LU6.2 V4, LUO V4, RJE V4, API, HLLAPI

TECHNOLOGY DEVELOPMENT SYSTEMS — Softmail Electronic Mail

STERLING SOFTWARE — PC-TRACS 3770AF, PC-TRACS 3780

TAXWARE SYSTEMS — Tax Preparation Packages, Electronic Filing

TDT GROUP — SIX/25 3270/3770, X.25, XENIX 286/386, Transfile, PC 3780

TROPICAL COMMUNICATIONS — pcX 25

UNIVERSAL DATA SYSTEMS — BSC, DIAL, SNA 3270, SNA 3770, SNA 4251

CLEO — Datatalker 3270, SNA/SDLC, Datasync 3270, Datasync 3780, UNIX 3780

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applications of an acquired company until a plan can be developed to integrate its applications into the acquiring company. This alternative has also satisfied the urgent need to move operations away from the acquired company's computer.

- **Shortage and expense of special skills.** Systems programmers, telecommunications experts and systems integration professionals are difficult and expensive talents to find, maintain and retain. Outsourcing firms may have the expertise that IS is unable to cultivate or acquire in-house.

Fears

Despite the good reasons to outsource IS functions, there are many fears associated with putting such a critical resource in the hands of outsiders. Some of these fears have merit, while others stem from a lack of experience and knowledge of the outsourcing business. Some major fears include the following:

- **"We will lose control."** Many IS executives express concern that they are giving up control when considering a move to an outsourcing facility. In fact, however, control can increase when IS personnel are better able to concentrate on issues with greater returns. In many cases, few IS executives even want to return to their own data center operation after using a remote computer service.
- **"They do not know our business."** This is normally not a problem with data center outsourcing, because you run your own applications; the outsourcer just runs the data center. Also, facilities management providers usually hire your people, who do know your business.
- **"They are not sensitive to our business."** While this could be true, experienced data center outsourcing firms are usually well-equipped to be responsive, and it is in their interest to be sensitive to your business. In many cases, they will be able to respond to urgent situations faster than a limited in-house staff could. Further, as the trend moves from primarily data center outsourcing to other forms, there will be more and more specialization, depending on the business or industry.
- **"Migrating to another computer would be a disaster."** This is a well-founded fear that deserves attention until the migration is complete. A computer migration can be like a rental car parking lot with long spikes at the entrance — once you're half-way in, you can't back out without some damage. Migrations can be complicated tasks that require careful planning; they may thus represent a good time to depend on experienced service companies.

Strategic, business-oriented issues also play a significant role in the outsourcing decision.

> A COMPUTER MIGRATION can be like a rental car parking lot with long spikes at the entrance — once you're half-way in, you can't back out without some damage.

Some of the more frequent business situations in which outsourcing could be a boon include the following:

- **Uncertain future of the company.** Certainly, an investment in computers should not be made if the financial health of your company is uncertain. In these circumstances, outsourcing may be a wise alternative to investing in additional computer hardware.
- **Increase capabilities.** Outsourcing may be a good way to increase the capabilities and services of your company. Access to specific software, people skills or special services such as electronic data interchange may be enough to justify outsourcing economically.
- **Preparing a business unit for sale.** Because carving the applications of one business unit out of a multiunit centralized data center is not a trivial task,

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units may be easier to sell if they are not using the same software used by other business units within the IS operations. Allowing them to begin operating independently makes it easier to pick them up and move them around as needed.

In every outsourcing situation, make sure the personnel involved — IS and otherwise — are included in the plans from the outset. Otherwise, productivity may go down as uncertainty and fear go up, and the outsourcing decision may backfire.

Company size

No matter what the reasons for outsourcing, companies of widely varying size can benefit from it. It used to be that smaller companies that could not afford to buy expensive computer hardware were the most ideal users of outsourcing. But the size of the companies involved in this trend is changing; certainly, when a facilities management deal is struck between Eastman Kodak Co. and IBM [CW, July 31], it's time to take notice.

Today, both centralized and decentralized companies — and those with revenues ranging from less than $200 million to more than $1 billion — have opted successfully for outsourcing.

There are other situations in IS, not always crisis-inspired, when good business judgment suggests considering the use of outsourcing.

Some of these situations include the following:

- **You can cut costs and/or improve service.** In either of these cases, it is always a good time to make a change.
- **You have IBM or IBM-compatible mainframes.** Such an environment is a prime candidate for outsourcing because of the high costs associated with running the hardware, operating software, application packages, database software and staff. The ongoing expenses of increasing capacity and conversion costs are also motivating factors supporting outsourcing.
- **You are considering major computer investments.** Building a new data center, consolidating data centers, upgrading to new hardware, buying new packages or installing a large communications network are all likely times to look at the economics of outsourcing.
- **You have acquired a new company.** If you do not have the capacity to assume the computing responsibility of your acquisition or there is not time to do so, the outsourcing alternative might be considered. Using an outsourcing firm provides time to plan a strategy for the orderly assimilation of the acquisition. A brute-force, move-it-over migration — with its inherent problems, costs and disruptions — may not be a reasonable alternative.
- **You are moving away from a corporate data center.** One company had a central data center shared by several sister companies. Because it planned to sell one or more of the companies, it was important to move them out of the central data center. The company found that outsourcing was an excellent alternative for the time period before the sale.

Don't do it!

There are, of course, situations in which outsourcing does not make sense. It should not be considered the panacea to solve all IS problems. Some situations that do not lend themselves to outsourcing include minicomputer environments and multivendor integrated environments.

Minicomputers seldom have the high expenses associated with mainframe computers and therefore are not good candidates for outsourcing. In fact, few, if any, remote computer services have offerings with Digital Equipment Corp., Prime Computer, Inc., Hewlett-Packard Co. or other minicomputer vendors' equipment.

In addition, most data center outsourcing vendors operate IBM and IBM-compatible environments and do not have the software personnel to support multivendor environments. This type of facility could, however, be outsourced on a facilities-management basis.

The use of outsourcing and the outsourcing industry today bear many similarities to the service-bureau and time-sharing work of the 1960s and '70s. In fact, the experiences of those days point to the following

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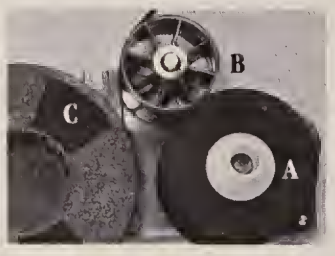

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possible future trends in outsourcing:

- **Outsourcing will increase.** The use of outsourcing will continue to increase and be a hot issue in the 1990s.
- **Outsourcing vendors will multiply.** The number of vendors providing data center outsourcing will continue to increase and will in time exceed the demand. Many of these vendors will be large companies offering time on their computers; however, be careful when using such firms because outsourcing internal IS is sometimes a questionable business venture that distracts from the mission of the companies' internal IS function. It is one situation in which using internal IS to external competitive advantage or profit may not be desirable. In any case, many of these new vendors will fall by the wayside as this market matures. In fact, since 1970, the number of time-sharing companies has decreased from 146 to a handful.
- **Systems integration-based facilities management firms will be on the rise.** Systems integration is a specialty field difficult to support internally, and the major outsourcing players will start to increase their offerings of systems integration-based facilities management services. Early entrants will capture a significant portion of this long-term and growing market.
- **Some companies will get burned.** The rapid growth and shakeout of the outsourcing market will cause problems for IS executives who rely on vendors that ultimately leave the business. Depending on the environment, it may or may not be difficult to relocate to another vendor or bring computing in-house again.

Whether you choose to go with an outsourcing firm or not, realizing that most IS executives who have recently chosen outsourcing for their companies have been unanimous in their praise of it should help ease some concerns. Many IS groups have realized savings, and one company actually cut its systems budget by half — from $8 million to $4 million.

Few are sorry to have stopped feeding the IS dragon with expensive salary budgets, hardware upgrades and facility expenses. By slaying the beast with outsourcing, they have given themselves time to address the fundamental IS issues that will determine success or failure for their companies. •

8 Steps

There are eight basic steps information systems executives should take when considering whether to go with outsourcing:

- **Step 1.** Have a current systems architecture plan. This is developed from the objectives of your enterprise and, therefore, requires the participation of top management.
- **Step 2.** List the pros and cons of outsourcing. Using your systems architecture plan and a thorough understanding of your enterprise, identify the issues, advantages and disadvantages of outsourcing your information systems functions. This list needs to be continually updated and revised throughout the process.
- **Step 3.** Understand your current and planned IS costs. These costs should cover a minimum of three years, with specific emphasis on any major expenses IS expects to incur within that period.
- **Step 4.** Starting with computer operations, prepare a detailed description of your environment. Include such items as hardware configuration, direct-access storage device requirements, systems software, applications software, telecommunications networks, activity at remote locations, peak and critical processing periods, output volume, tape volume and other current and future requirements.

It is important that all vendors work from the same description and that any changes get communicated to all active vendors. Large organizations and government agencies will want to prepare a formal request for proposal (RFP).

- **Step 5.** Prepare computer usage statistics. It is important to supply such information and even more important for the vendor to ask for it. An accurate analysis of usage and, therefore, costs cannot be determined without the use of these statistics; it is critical to your decision.
- **Step 6.** Starting with computer operations, identify six suppliers of remote computer services. Contact these vendors and have them visit your location and review your requirements or RFP.
- **Step 7.** Review proposals. You will receive a variety of pricing schemes and proposal approaches, making comparisons difficult. Encourage potential vendors to keep their pricing as simple as possible. Certainly, you will want to visit the top contenders if outsourcing appears to be a realistic alternative. The vendor you select must have experience and be able to demonstrate successful migrations it has completed.
- **Step 8.** Negotiate a contract. Most vendors are flexible and will negotiate contract issues. It is important to identify all the issues you want covered in the contract. Depending on your particular situation, this can be a long list.

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Nell Margolis

What's in a name?

Granted, it's an old whine — but in new battles.

The advent of Stardent Computer Corp. earlier this month once more raised what is getting to be an age-old question in what is barely an age-old industry: to wit, what's in a corporate name?

Lots, say a raft of consultants. So many of them have said it for so long, in fact, that some of them have started up lucrative businesses addressing nothing *but* this question and supply carefully strategized names to companies willing to pay big bucks to ensure that they make the correct first impression.

Lots, say an even larger raft of computer company executives who, over the years, have confided the anguish they've gone through trying to arrive at the right name for their respective companies.

Lots, echo the scores of users (or would-be users) who have confided over the years their anguish at not being able to remember companies' names — or, worse still, their embarrassment at having to utter some of them.

Lots, said the last *Computerworld* columnist who addressed the topic. She was driv-

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Fraud alleged at Miniscribe

BY NELL MARGOLIS
and JEAN S. BOZMAN
CW STAFF

LONGMONT, Colo. — Hints of "material financial irregularities" at disk-drive maker Miniscribe Corp. erupted last week into findings of alleged runaway fraud as an investigative committee's report called into serious question the company's ability to maintain its credibility, its customers, its investors and, ultimately, its existence.

"It appears that Miniscribe's senior management perpetrated a massive fraud on the company, its directors, its outside auditors and the investing public," read the report submitted to the Miniscribe board last week by the firm's Independent Evaluation Committee. The group pored over records and interviewed past and present personnel at the troubled company for six months, uncovering a litany of apparently corrupt practices.

Just as alarming, they said, was a dismal montage of failures within the company's "corporate governance structures, disclosure procedures and financial reporting and accounting systems" — the framework supposedly erected to screen or smoke out the sort of wrongdoing that apparently found fertile breeding ground at Miniscribe during the administration of former Chairman and Chief Executive Officer Q.T. Wiles.

Neither Wiles nor any other Miniscribe staffers were specifically named as having participated in any alleged wrongdoing.

"This is devastating — it's an absolute disaster," said Steven Ossad, an industry analyst at Montgomery Securities. "I think Miniscribe's had it."

The Independent Evaluation Committee, composed of three newly elected directors with no previous ties to the company, convened in March to examine Miniscribe's financial workings while investigating charges in shareholder suits that had been filed against the company. An interim report issued in June triggered an executive exodus from Miniscribe, including the abrupt departure of the company's chief financial officer, William Lorea [CW, June 26].

The final report to the board last week painted a shocking portrait of connivance against the outside world of users and investors. Ranking Miniscribe officials, it said, intentionally falsified inventory and sales figures over several years, using a series of bizarre methods ranging from altering numbers in an auditors' report to delivering shipments of bricks to distributors and reporting $4.3 million worth of "disk-drive sales."

Implications of insider trading that threaded throughout the re-

Continued on page 96

Synoptics rides to top of wiring niche market

BY CHARLES VON SIMSON
CW STAFF

MOUNTAIN VIEW, Calif. — The basic technology does not come from a Palo Alto garage but from Xerox Corp. research laboratories. The product does not push out the envelope of the information age but rather thrives in the shade beneath the boom in local-area networking. The company's officers are not wide-eyed kids but veterans of the corporate wars.

Synoptics Communications, Inc. may not make anyone forget the personal computer revolution, but its 561% annual revenue growth rate in 1988 — its first year as a publicly held company — might make a few old-timers nostalgic for the early days of Silicon Valley.

The company's basic product is the Lattisnet line of 10M byte/sec. concentrators that transmit Ethernet over normal shielded and unshielded twisted-pair telephone lines. This unglamorous "wiring cabinet" niche was worth more than $40 million to Synoptics in total revenue in 1988, and, according to the company, there is no end to the growth in sight.

The pitch to IS is that network nodes can be connected more efficiently and cheaply over unshielded twisted-pair — the standard telephone wiring often already in place in buildings — than over the coaxial cables currently used for the job. In addition, the company has developed an icon-driven network management system for this layer of connectivity that has won early praise from users. The firm increased its installed base from 18,000 to 125,000 network nodes in 1988 alone.

Synoptics' Ludwick *foresees continued growth for his firm*

"There were people at Arco who were married to coaxial cable," said N. J. Tripode, network manager at Arco Oil and Gas Co. in Dallas. "But the substantial cost savings in installation and maintenance were a large part of the justification of going with shielded twisted-pair."

The Synoptics technology came out of a development project at Xerox's Palo Alto Research Center (PARC) labs aimed at increasing the market acceptance of the Ethernet network protocol by developing lower cost connectivity solutions. Xerox abandoned the effort because the product did not fit into its marketing strategy. The technology was licensed by Synoptics Chief Executive Officer Andrew Ludwick and Chief Technical Officer Ronald Schmidt, both of whom were then working at PARC. The two founded Synoptics in 1986.

Observers agree that the technical solution is solid, but

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Coming attraction: Info's new look

BY RICHARD PASTORE
CW STAFF

Women in bikinis. Grab bags. Magicians pulling Macs out of hats. In the past, such gimmicks may have lured attendees to vendor exhibits and helped vivify the overall trade show. However, this approach is no longer enough. Producers of shows such as Info — a 16-year-old event aimed at information managers — realize that they must coax money- and time-strapped users and buyers back by giving them what they really need — pertinent information.

"What we've done is take a good hard look at the Info show," said Kerry Gumas, vice-president of Info producer Cahners Exposition Group in Stamford, Conn.

After 1988's show was criticized by many attendees as logistically confusing and technologically behind the times, Cahners changed its expo arm into a strategic business unit and replaced former show organizer Frank Fazio with Gumas. Then it conducted surveys and met with exhibitors and attendees to gauge Info's viability. The feedback was not positive.

To address their concerns, Cahners will inaugurate a "show-within-a-show" format at Info '89 in New York next month. On the show floor, areas will be set aside for such vertical markets as graphical presentation and computer security.

The sectionalized approach was designed to maintain the show's broad spectrum while also letting attendees save time by visiting areas pertinent only to their technology interests, Gumas said.

In addition, the specific technology sections provide a more focused venue, thus encouraging vendors to bring along their latest technology for display.

Attendees of last year's Info contacted by *Computerworld* applauded the revamp. "It would be an improvement to make it easier to find things that address more specific concerns," said Ronald Ferreri, vice-president of New York Catholic High Schools. Ferreri said he plans to attend this year's show to look specifically for local-area networking information.

"You couldn't browse last year's show quickly," added Andy Frothingham, who attended Info '88 on behalf of a New York advertising firm.

Frothingham, who lives in Manhattan, said he only plans to attend next month's show because of its proximity. "I probably wouldn't go if I had to travel to another city," he said.

Cahners also hopes to improve the scope of the show by wooing user groups for the first time. Eight user groups and six industry associations will be represented at the new User Group and Association Information Center.

These changes, along with a 30% hike in promotional budget, are not expected to pay off in higher attendance this year; Gumas said he anticipates repeating last year's 40,000 figure. However, he said he is "hoping that the general perception will be that it is a better show than last year."

Miniscribe

CONTINUED FROM PAGE 95

port appeared almost anticlimactic. "We notified the SEC and provided them with the report," said Gerald F. Hallaren, Miniscribe's director of strategic planning. "Beyond that, we don't know what they're doing about this. They're probably still reading the report." The full report, which cost an estimated $2 million, came in at more than 1,500 pages.

Mary McCue, a spokeswoman for the Securities and Exchange Commission, said that SEC policy prohibits either confirming or denying that an SEC investigation is in progress. "If and when any violation of federal securities law is found, we [will] file a lawsuit," she said.

Whatever the eventual legalities and wherever they fall, the greatest violation might well prove to be that of trust, Ossad said. Noting — as did other industry observers — the integrity of the current slate of Miniscribe executives and their efforts to concentrate on new products and reconstituted finances, he nevertheless found a positive prognosis unlikely.

"Everything they say is suspect now," he said. "This is a fast-moving business; why should anyone take a chance with a company that's let this kind of thing happen?" The disk-drive niche, Ossad noted, is spoiling for a shakeout. Given a wide range of choices, he said, "Why should anyone take their chances buying from Miniscribe or investing in them?"

Miniscribe's customers — a group whose identity the company has tended to guard closely, further unsettling some analysts — were themselves guarded in early reaction to last week's revelations. "We're still using them," said a spokesman for Compaq Computer Corp., who declined to confirm to what extent.

At Apple Computer, Inc. — identified by Miniscribe as a 20M-byte hard disk customer — a spokeswoman declined to confirm or deny the relationship.

"I think they [Miniscribe] have a chance to pull through," said Robert Katzive, vice-president of Disk/Trend, Inc., a market research firm in Mountain View, Calif. "They have to do everything right now. They can't make any more mistakes."

IN BRIEF

Andersen coup

William C. Copacino, 39, former vice-president and director of manufacturing and logistics consulting at **Arthur D. Little, Inc.** in Boston, has joined rival **Andersen Consulting.** As a partner in Chicago-based Andersen's 350-person Strategic Services practice, Copacino will be responsible for the logistics and operations strategy practice for North America from the firm's Boston office.

. . . .

Right On

Mitch Kapor's **On Technology, Inc.** tapped two **Lotus Development Corp.** veterans for senior sales positions. Kapor, who founded Lotus and has gone on to start up Cambridge, Mass.-based On, announced the appointments of **John Shagoury** as vice-president of sales and **Robert Simmons** as national sales manager. Shagoury served as director of sales and distribution planning at Lotus and most recently was vice-president of corporate planning and marketing at Corporate Software in Westwood, Mass. Simmons was a Lotus senior marketing representative and spent the past two years as Eastern regional sales manager of Adobe Systems, Inc.

. . . .

Chip set suit

Microproject Corp., a Unix-based computer systems vendor located in Marina Del Rey, Calif., has slapped **AT&T** with a multimillion dollar lawsuit. According to a complaint filed in U.S. District Court in Los Angeles last week, AT&T knowingly supplied a defective Unix chip set to serve as the basis of a Microproject computer line, while a cured version of the same chip set went into AT&T's own line — and into direct competition with the inherently faulty Microproject computers.

. . . .

And so it goes

Applied Communications, Inc., an Omaha, Neb.-based subsidiary of **US West**, is the new owner of the Action2000 line of retail and wholesale banking software products from **Electronic Data Systems, Inc.** EDS, which acquired the Action2000 line when it bought **Mtech** last year, rushed to assure customers that the company is not abandoning its commitment to the financial industry.

. . . .

The high road

Compaq Computer Corp. has increased its Scottish presence by 135,000 square feet with last week's purchase of **Wang Laboratories, Inc.**'s manufacturing facility in Stirling.

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Synoptics

FROM PAGE 95

critics contend that today's fancy box is tomorrow's dime-a-dozen, made-in-Japan widget, leading the company that relies on it into a bleak backwater where basic manufacturing wins the day and margins shrivel to nothing. Even in the face of breakneck growth, a number of Wall Street analysts have dismissed Synoptics' long-term prospects and continue to short the company's stock.

Many advantages

Ludwick, however, sees the company as having a number of unique advantages that will help it avoid the commodity fate. "Even with the growth we have had, we do not view this business as bulletproof," Ludwick said. "Over the long term, new pressures will appear. We are confident that we can stay ahead."

New products, too, will appear. Currently under development is a line of concentrators that will deliver IBM's Token-Ring network protocol over twisted-pair wiring and ultimately deliver Fiber Distributed Data Interface capabilities.

"This is the classic Silicon Valley story," said George Kelley, network analyst at Goldman Sachs & Co. "A company becomes a market leader in a niche and stays far enough ahead of the potential competition that it isn't worth their while to enter the market." Kelley said that Synoptics is focused on supporting Token-Ring and Ethernet over unshielded twisted-pair in a way that IBM cannot be, simply because it can support but will never endorse Ethernet.

"The debate is whether we can bring new technology to market faster than competitors can force margins down," Ludwick said. "Our track record says we can."

It is an impressive record. The company has logged triple-digit growth almost since it was founded. San Jose, Calif.-based market research firm Dataquest currently estimates that the company dominates the market, with a 69% share of Ethernet PC LAN connections over unshielded twisted-pair. AT&T follows distantly with 12% and other players, including IBM and Ungerman-Bass, Inc., supply 19%.

But even among customers, there is a view that physical connectivity products may become a commodity. Arco uses Synoptics Ethernet over unshielded twisted-pair products to serve about 110 users in its Dallas headquarters office. At the same time, however, the company went with a Token-Ring product from IBM, even though Synoptics has a Token-Ring product in development and is promising delivery by the end of 1989.

"Price is not necessarily an important factor for us," Tripode said. "But everybody and his brother has a network management system. Our concern is to get the job done."

In the long run, that view of the company may pose problems. In the meantime, Kelley sees the company's heady growth continuing unabated at least through 1991. So Silicon Valley nostalgia buffs will do well to get out their old scrapbooks. For Synoptics, at least for now, happy days are here again.

Memos to tell Wang news

LOWELL, Mass. — Whatever else befalls employees at embattled Wang Laboratories, Inc., none of them will be subjected to the indignity of having the morning paper tell them that they are out of work. And they've got it in writing, as a promise from the president.

In a memo issued last week, recently appointed Wang President Richard Miller confirmed that the company was expeditiously pursuing its ongoing effort to reduce staff by as many as 25,000 jobs. However, he dismissed the prospect of as many as 10,000 layoffs in as few as nine months — a figure attributed to analysts' projections in at least one local newspaper as "wild speculation."

Wang employees, the Miller memo said, will be the first to be told of any new payroll pruning.

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3Com profits ease concerns

New poison pill plan effectively forms barrier to takeover

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — There is nothing like a significant drop in stock valuation to make a company start looking nervously over its shoulder. On the other hand, a profitable quarter, especially if the outcome was in doubt, can help boost investor confidence.

It has been a frustrating summer for network supplier 3Com Corp., which found itself faced with both situations.

But after giving Wall Street the willies in July by warning of a possible loss in its first fiscal quarter ended Aug. 31, 3Com confirmed a profitable quarter last week, thanks mostly to a strong August. Orders are expected to hit approximately $95 million, resulting in sales of about $89 million. In June, 3Com had predicted first-quarter revenues of about $100 million.

Final results will be available around Sept. 21. Meanwhile, stung by strong analyst reaction to its efforts at fiscal forecasting, 3Com is zipping its lip. "We have discovered this is not a desirable practice, and we are eliminating it," said William Krause, 3Com's chairman and chief executive officer.

The reason the potential of a loss — which one 3Com insider said was highly unlikely at the time — was mentioned in the first place was to cover all possible options for the quarter, Krause said. "We didn't want to have to ever do another press release [on the quarter]," he explained. "It's much better to get all the negative news out and reset expectations. Then you demonstrate with good performance that everything is okay, and there's no reason to be such worrywarts."

As of last Thursday, 3Com's stock had bounced back up to a healthier 13⅞.

Seesawing forecasts for the quarter are not solely responsible for either the downward turn in 3Com stock prices or the subsequent correction. The impact of competitors' price slashing, turmoil in the distribution channels and a slow product cycle helped 3Com stock plummet from a high of 28¾ in May to barely 11 points in August.

However, the network supplier has not been sitting idly by while a miffed Wall Street downgraded its stock to levels dangerously enticing in this crazed era of buyouts.

Last week, 3Com unveiled a shareholders' rights plan, admitting that it is among the last in Silicon Valley to do so. Krause said no would-be buyer has yet approached the board, but reiterated 3Com's desire to remain independent. "It's another mechanism to further discourage people from thinking that they can get a cheap deal, [as well as a way to] ensure that stockholders get proper value for their stock," he said.

As part of the plan, 3Com's board of directors declared a dividend distribution of one common stock purchase right on each outstanding share of common stock. The dividend distribution is payable as of Sept. 20, 1989, to shareholders of record on that date, and the rights will expire 10 years later unless redeemed or exchanged at an earlier date.

The poison pill plan supplements, rather than replaces, an agreement between 3Com and minority investor Hewlett-Packard Co. [CW, April 10] that serves as a barrier to anyone intent on taking over 3Com by tossing HP into the picture. It also protects HP's investment in 3Com, which, according to the companies' current agreement, could rise to 10%.

Phoenix posts another loss

BY RICHARD PASTORE
CW STAFF

NORWOOD, Mass. — Phoenix Technologies Ltd. will have to postpone its rise from the ashes for another quarter: The company confirmed analyst estimates last week that it will post a $7 million fourth-quarter loss and a $2.8 million loss for the year ended Sept. 30.

The bad tidings are the latest in a series that has seen Lance Hansche pass in and out of the chief executive officer's office in just four months, a $1 million loss last quarter and a 23% work force reduction since May.

Acting CEO Theodore Joseph, who predicted that Phoenix will return to profitability during the second half of 1990, also announced new cost-cutting measures. Most significant is the scuttling of Phoenix's Unix-porting program aimed at Sun Microsystems, Inc.'s Scalable Processor Architecture workstation market.

"It's far more difficult a task to help support Unix than would meet the eye," said David Bayer, an analyst at Montgomery Securities in San Francisco. "It doesn't lend itself as much to standardization as was originally envisioned by this and other companies."

Bruce Crane, Phoenix's director of investor relations, confirmed that no further layoffs were intended. He refused to divulge specific loss estimates, but said that the analysts' projections were "in the neighborhood."

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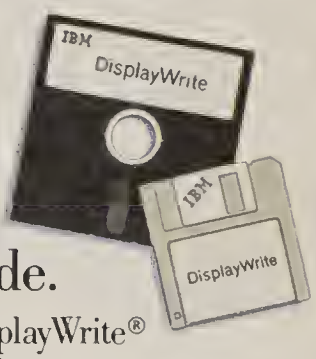

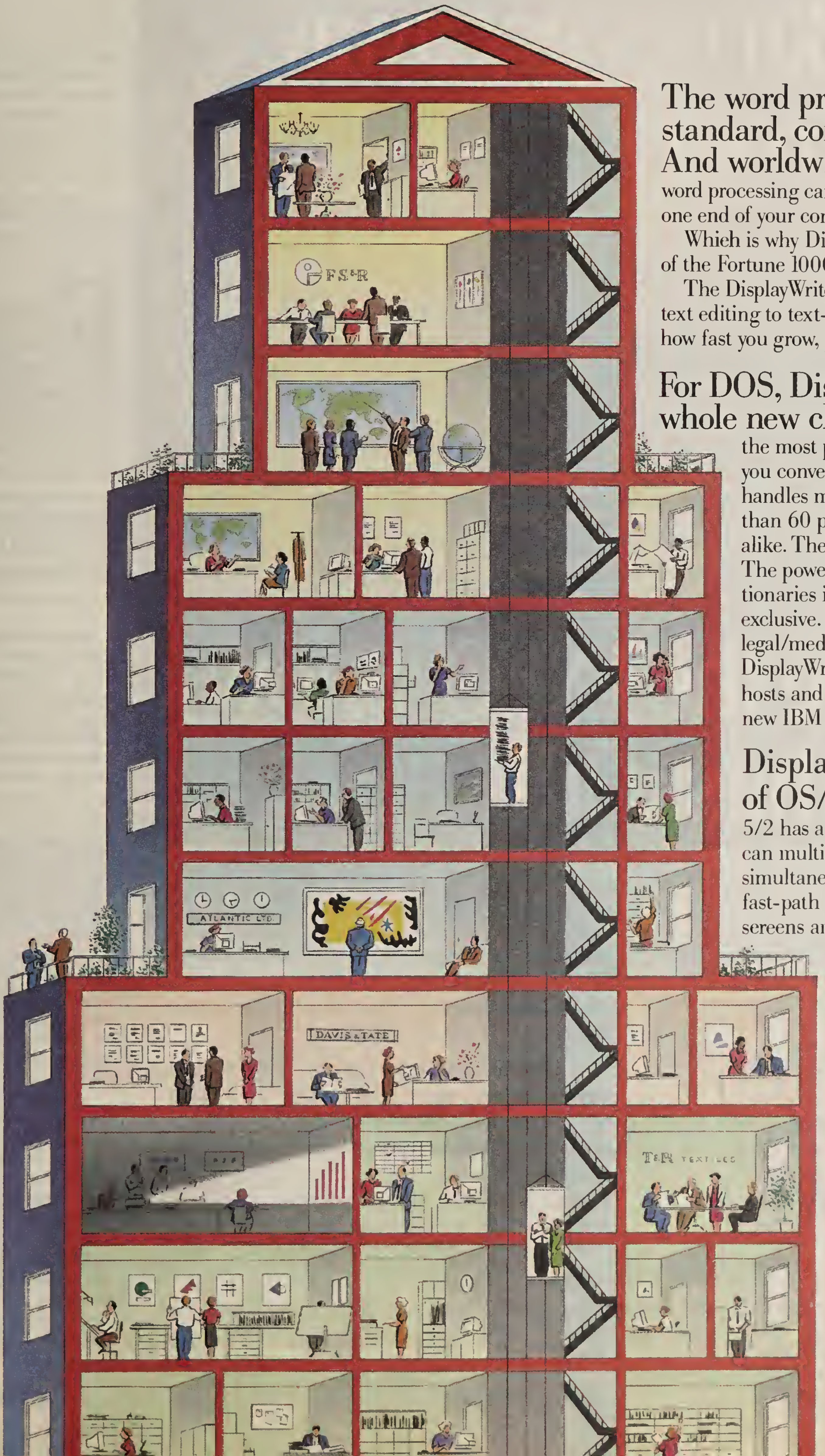

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CONTINUED FROM PAGE 95

en to it by the birth, attended by no small amount of fanfare, of a company whose name no one could pronounce. It was BIIN. Can you say BIIN? Here's a hint: It's an acronym. Do you know what the letters stand for?

Okay, next question: Can you say Apple? Was it not, in fact, probably one of the first words you *could* say, as you eagerly reached for one? Did you ever eagerly bite into a BIIN? I rest my case.

Following a few basic ground rules would eliminate some of the most misbegotten names in this industry, which in turn would save companies a lot of consultancy fees, both before the birth and after the christening, when customers are having a hard time figuring out who they are and what they do:

- If it has more than three letters and doesn't spell a word, don't use it.
- A corollary to the above rule: If you have to spell out the words in order to get people to remember the initials, you've defeated your purpose; don't use it.
- If you have to explain it in parentheses, don't use it.
- If parentheses don't go far enough and you have to explain it in a mailing, don't even think it.
- If people will remember it for the wrong reasons, don't use it.

Stardent is the brainchild of Ardent Computer Corp.'s Allen Michels and Stellar Computer, Inc.'s John William Poduska — two industry names to be reckoned with for real.

They came up with Stardent, we're told, in the spirit of equality — a true melding of their merging companies' names. (Arguably, the only such melding within the realm of possibility; just try saying Steldent or Ardlar out loud.) Now, the spirit of equality is something not to be taken lightly. Unfortunately, the same cannot necessarily be said for a supercomputer company with a name that sounds like toothpaste, or maybe sugarless gum. Admit it: "Nine out of 10 family dentists recommend Stardent" sounds strangely familiar.

Names, of course, aren't everything. Technology, management, marketing, distribution and a whopping dose of luck still count for something, even in the most cynical of circles.

However, Stardent is starting out in life with some serious obstacles to overcome.

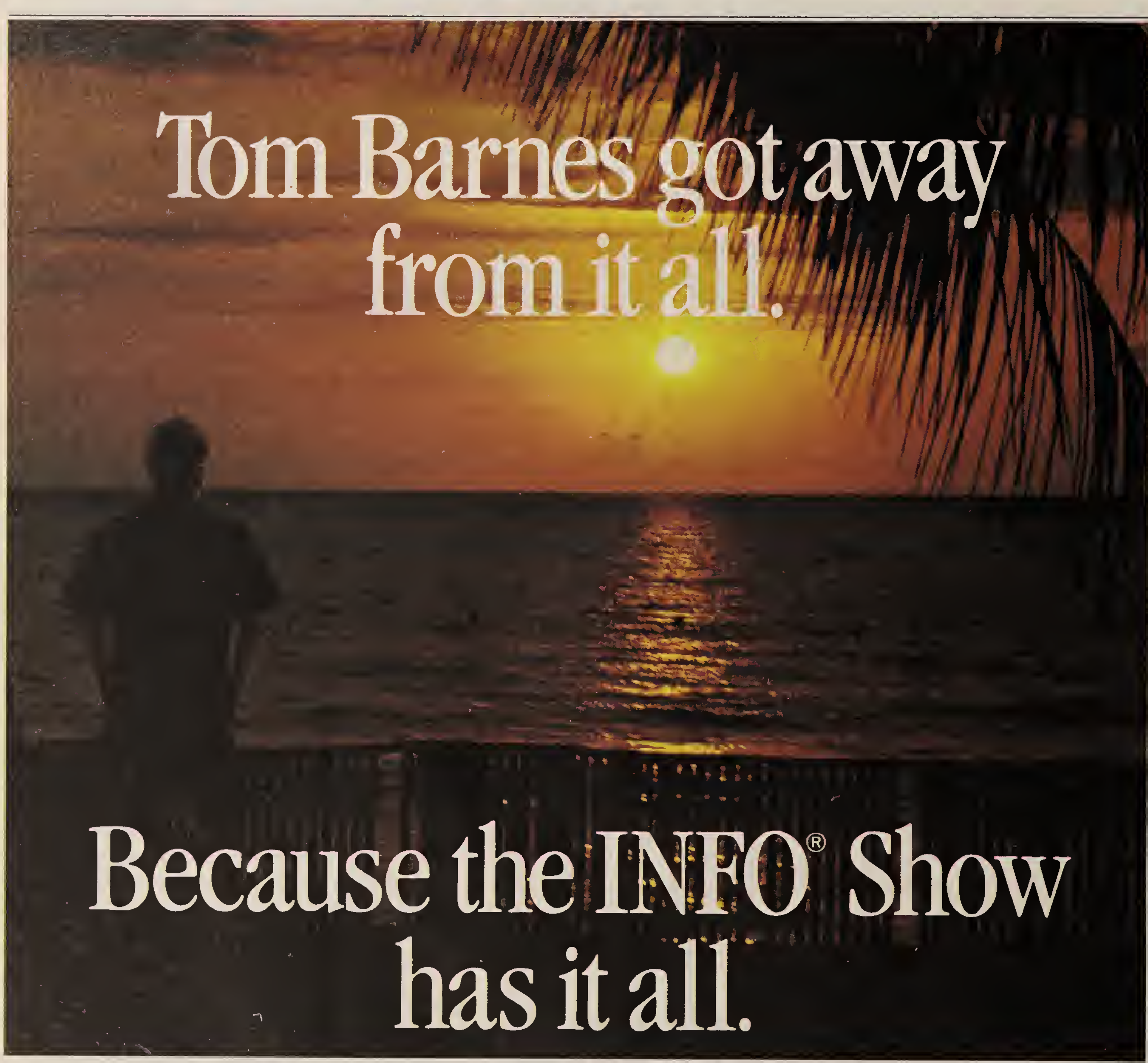
> FOLLOWING A few basic ground rules would eliminate some of the most misbegotten names in this industry, which in turn would save companies a lot of consultancy fees, both before the birth and after the christening.

The firm is aimed at a tricky, limited and hotly contested market. It's headed by a duo so dynamic that analysts coast to coast have questioned their ability to accommodate each other's co-tenancy in the executive suite, even on an interim basis. It's heading out to do battle in the computer industry. In the global marketplace. In 1989. Up against factors like these, one would think a company could use a start with its best foot forward, rather than with its foot in its mouth.

On the positive side, commented one seasoned industry observer, "I think naming the company Stardent was a gutsy act; it demonstrates a lot of confidence to choose a silly name."

And when you get right down to it, maybe it isn't so silly after all. As a lot of companies and their investors are finding out the hard way, there's a finite number of people with both sophisticated graphics supercomputing needs and the megabucks budgets to indulge them. On the other hand, everybody has teeth . . .

Margolis is ***Computerworld's*** senior editor, industry.



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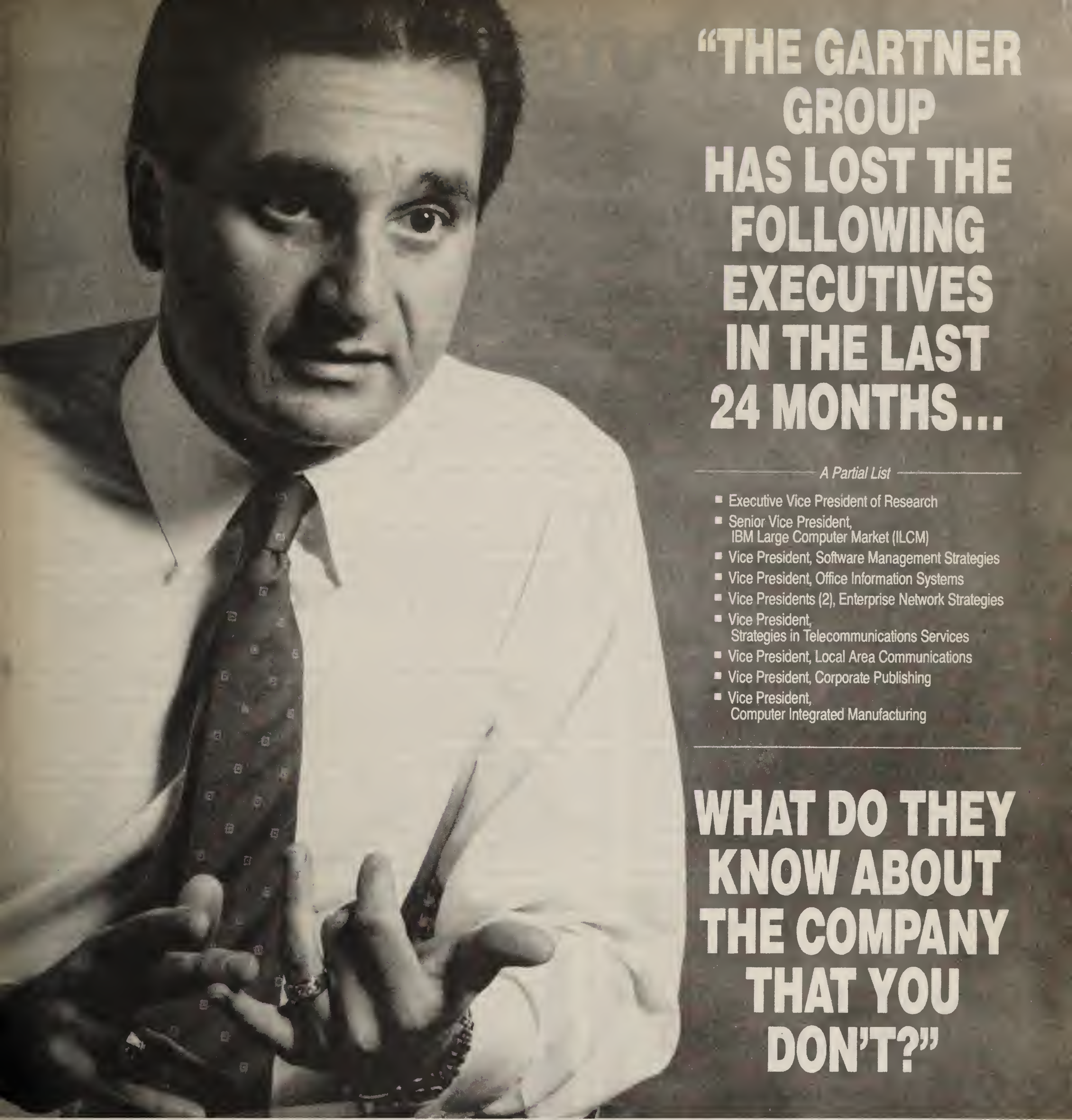

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COMPUTER CAREERS

Before joining a troubled firm

Size up the company's management and business, along with yourself

BY JOHN J. DAVIS
SPECIAL TO CW

It's the telephone call you've fantasized about. It sounds like a dream job — hefty salary, excellent perks and benefits, power, autonomy and an industry you know like the back of your hand. The caveat is that the company is in trouble. Its earnings have been falling at a precipitous rate for three years. It is struggling to hold its markets in the face of intense competition, forcing a 10% staff reduction. To make matters worse, two hungry conglomerates are nibbling at its heels, waiting for the right moment to pounce.

Your mission — should you choose to accept it — is to turn the information systems function around. It is quite a decision. On the one hand, the job sounds glamorous and exciting; on the other, you are playing Russian roulette with your career.

It is hard to turn your back on a 25% boost in pay — maybe 50%, if you are successful — not to mention perks and benefits that you may not find at a healthy company.

What should you do? What factors should you consider to help you make your decision? A good way to begin is with an honest self-appraisal, considering the following issues:

- Can you tolerate massive doses of risk? You are jumping into the fire: Are you willing to be singed by the flames? Do not be naive. Do not expect to walk into a situation like this and come out unscathed.

This situation is not for the battle-shy. It is for someone who enjoys a good fight, who envisions himself a survivor, a winner. You are going to be working in a high-stress environment, and it will spill over into your personal life. And more likely than not, you will be doing most of the grunt work yourself.

- Are you willing to work long hours? Forget about working conventional 9:00 to 5:00 days. It is more likely that your work days will begin before 8:00 and end whenever. Weekends? Count on giving up many Saturdays. Travel? You guessed it. The bigger the company, the more travel you can expect. If you are not pacifying employees in another part of the country, you could be negotiating with hardware and software suppliers, managers and fellow executives from here to Zimbabwe. What would those tasks do to your family life? Wreak havoc.
- Are you an analytical problem-solver or a nuts-and-bolts person who needs direction? Troubled companies do not need more soldiers. Most are already burdened with them. They need innovative thinkers who relish tackling tough problems. The fun and challenge is in unraveling the problems and finding answers.

Now take a hard look at the company from these strategic vantage points:

> THIS SITUATION is not for the battle-shy. It is for someone who enjoys a good fight, who envisions himself a survivor, a winner. You are going to be working in a high-stress environment, and it will spill over into your personal life.

- How aggressive is the management? Is it conservative and unwilling to make bold strategic leaps? If so, you may be up against a brick wall, making your job all the more difficult and your stay tenuous. Management should be ready to stand behind you and support you.
- How strong is the product line? Is it excellent or marginal? More importantly, is it salvageable? Can it be improved without spending an exorbitant amount of money, or does the entire line have to be scrapped and overhauled? If there is no hope of a turnaround within a reasonable amount of time, joining the company may be the wrong move to make. The same rationale applies if the company provides a service.
- How strong are the company's markets, and where are they? Is the company perishing in all the markets or just losing its share in some of them? How much market erosion has there been in the past few years?

Networking and approaching officials of the company directly can provide enough information to draw your own conclusions. If the market decline is enormous, indicating a precipitous, unrecoverable loss, you could be facing the prospect of beating a dead horse.

With all the information in front of you — preferably on paper — the decision-making process should be straightforward. Put the risks on one side, the rewards on the other. Which are greater? You have your answer.

Crisis situations are a marvelous opportunity to show what you can do and prove that you are a superstar. The risks are high, the stakes are formidable; you could lose your shirt. On the flip side, a victory could catapult your career to a new plateau, strengthening your bargaining position. If you see yourself as a budding chief information officer, a troubled company is a ready-made battlefield on which to show your mettle.

Silver linings

Furthermore, you could win even if things do not work out for the company and it crumbles. Unless you are the chief executive officer, no one would consider it a strike against you. When searching for a new position, senior executives will admire your courage and think of you as a clutch player, someone who can take the heat.

Individualists stand the best chance of thriving in a troubled company. In contrast to traditional corporate bureaucrats, they relish the opportunity to rewrite the rules to suit their purposes.

Should you decide to accept such a position, do not ask for an employment contract when negotiating the initial terms of employment. You are unproven and it could do more harm than good. Demonstrate what you can do first and then ask for a contract. Once you have proven yourself, you are in an excellent position to make realistic demands.

Davis is president of John J. Davis & Associates, Inc., a New York-based executive search firm specializing in information systems management.

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(subject to revision)

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- Experiences of recent MIS graduates in their first jobs and what helped them in school
- The MIS career ladder
- Profiles of acclaimed top level MIS executives
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CAREER INDEX

July 1989 computer recruitment advertising activity*

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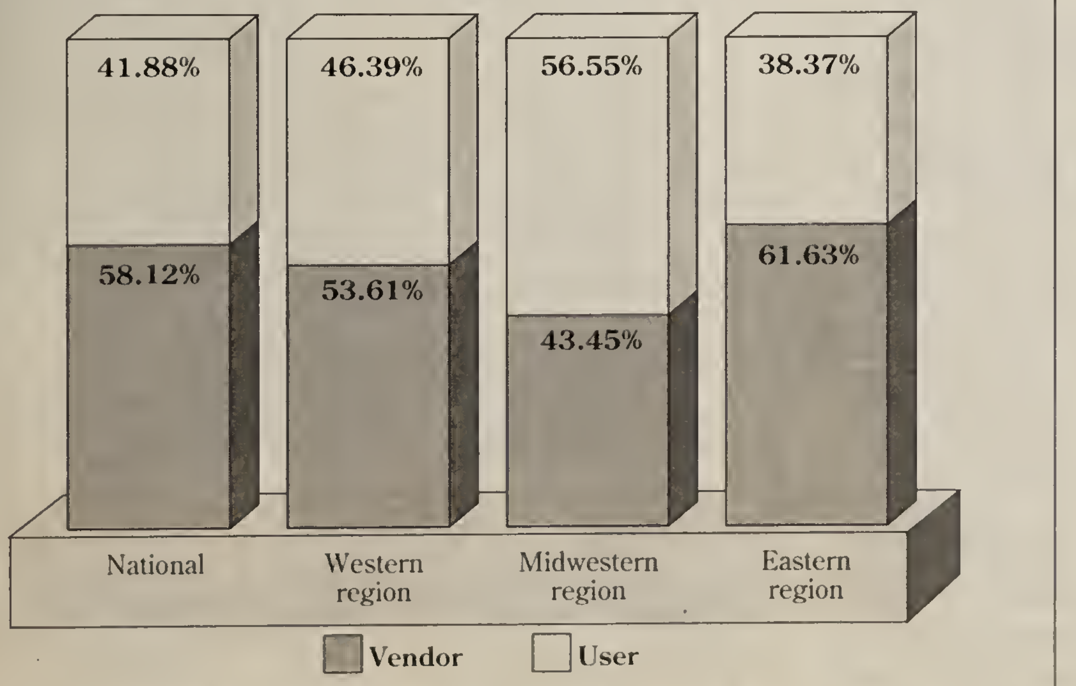

*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

SOURCE: CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATABASE

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MARKETPLACE

The fight for software rights

Joint development of customized software leads to copyright confusion

BY RAYMOND T. NIMMER
SPECIAL TO CW

"Understand what you are buying or selling and get what you pay for."

These rules govern all contracts for software, but they are hard to apply to many agreements for customized development. A failure to understand or apply them lies at the heart of most disputes over software contracts.

If you simply buy packaged software, with all its inherent strengths and blemishes, deciding who controls its use should be straightforward. Under today's law, the software provider holds the copyright and other proprietary rights to the product. The company acquiring the software simply obtains a license granting permission to use it. The terms of the license describe when, where and how the software can be used. The licensee may own the copy, but the licenser retains the copyright.

Deciding who controls the software and what rights the parties hold is much more difficult for software developed or customized for a particular purpose. Here, both the developer and the acquirer contribute to the software's final form. The buyer provides information — often quite specific — about functions to be performed or other needs. The software designer makes choices about performance features by talking to and interacting with the users. For buyers with technological expertise, the interplay between designer and client can be extensive, with frequent consultation and testing.

Key questions

Who "owns" the software? Who has the right to modify it? Can the designer sell the completed software, or parts of it, to other clients? Ideally, you solve these questions through a contract. If not, you are left hanging on wildly uncertain legal rules. Very often, the buyer has far, far fewer rights regarding the software than expected.

At one extreme, the transaction may be the same as that of a purchase of packaged software. The software designer provides the creative authorship — designing the structure, laying out the user interface and writing code. The designer is the sole author. The buyer holds the end product as a mere licensee.

At the other, less common, extreme, the buyer is extensively involved in creating the structure and interfaces, perhaps even in some coding. The software supplier serves more as a clerk or secretary. The true author is the buyer, not the designer. The designer at best holds a license to use elements of the software in the future. The copyright is owned by the buyer.

Usually, transactions fall somewhere between these extremes. The buyer comments on and contributes to the design of the user interface but does not code. The software designer creates the program's structure, consulting with the prospective end users in doing so.

VERY OFTEN, the buyer has far, far fewer rights regarding the software than expected.

It is important to remember that many of the rules of software copyright come from a field of law intended to address authorship of articles, novels and poetry. You can begin to see the problems in deciphering authorship and control of software. Are the parties co-authors or separate authors of distinguishable parts of the package, or is one or the other the sole author?

Addressing such questions in software contracts calls for several of the following considerations:

- Decide who has the right to make copies. Very often, the best answer will be that both parties have some rights. Of course, the user frequently wants to make backups or use more than one copy. The issue of the right to copy can be equally important for the software designer who hopes to build a set of tools.
- Decide who has what rights to modify the software. Copyright law gives the "author" the sole or exclusive right to make derivative works. Some copyright cases suggest that this covers the right to modify existing copies. If it is difficult to decide who is the author, it is important to expressly agree about the right to modify the copy delivered to the buyer.
- Decide who has the right to distribute copies to other parties. Users usually intend to use the software in their own operations. Even then, however, some buyers plan to resell it. The software designer, on the other hand, may want to use all or part of the software in future work. Unless he is the sole author or the co-author, he has no right to do this without an express agreement.
- Decide who holds the responsibility for failures in specific aspects of the program. When the parties work together to make a product, they must understand the shared responsibility they are undertaking. If the user interface is awkward and unmanageable, for example, is this the responsibility of the programmer or the user?

Unfortunately, many software projects proceed on the assumption that problems never occur. Experience shows that they can, however, especially when planning is inadequate. Paying attention to what you are buying and getting what you have paid for is critical to effective software development transactions.

Nimmer is counsel to the law firm of Sheinfeld, Maley & Kay in Houston and author of *The Law of Computer Technology*, published by Warren, Gorham & Lamont.

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	Closing price	Recent high	Recent low
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XT Model 086	$750	$1,150	$700
XT Model 089	$1,025	$1,400	$950
AT Model 099	$1,625	$1,850	$1,400
AT Model 239	$1,800	$2,100	$1,700
AT Model 339	$1,850	$2,000	$1,700
PS/2 Model 50	$1,675	$2,000	$1,600
PS/2 Model 60	$2,625	$3,300	$2,500
Compaq Portable I	$450	$750	$325
Portable II	$1,700	$2,000	$1,650
Portable III	$2,500	$2,800	$2,200
Portable 286	$1,600	$2,000	$1,600
Plus	$800	$1,200	$675
Deskpro 286	$2,025	$2,350	$1,700
Deskpro 386	$2,750	$2,900	$2,500
Apple Macintosh 512	$475	$650	$300
512E	$550	$925	$475
Plus	$1,000	$1,150	$750
II	$3,050	$4,175	$2,500
Toshiba T-3200	$2,650	$3,000	$2,475
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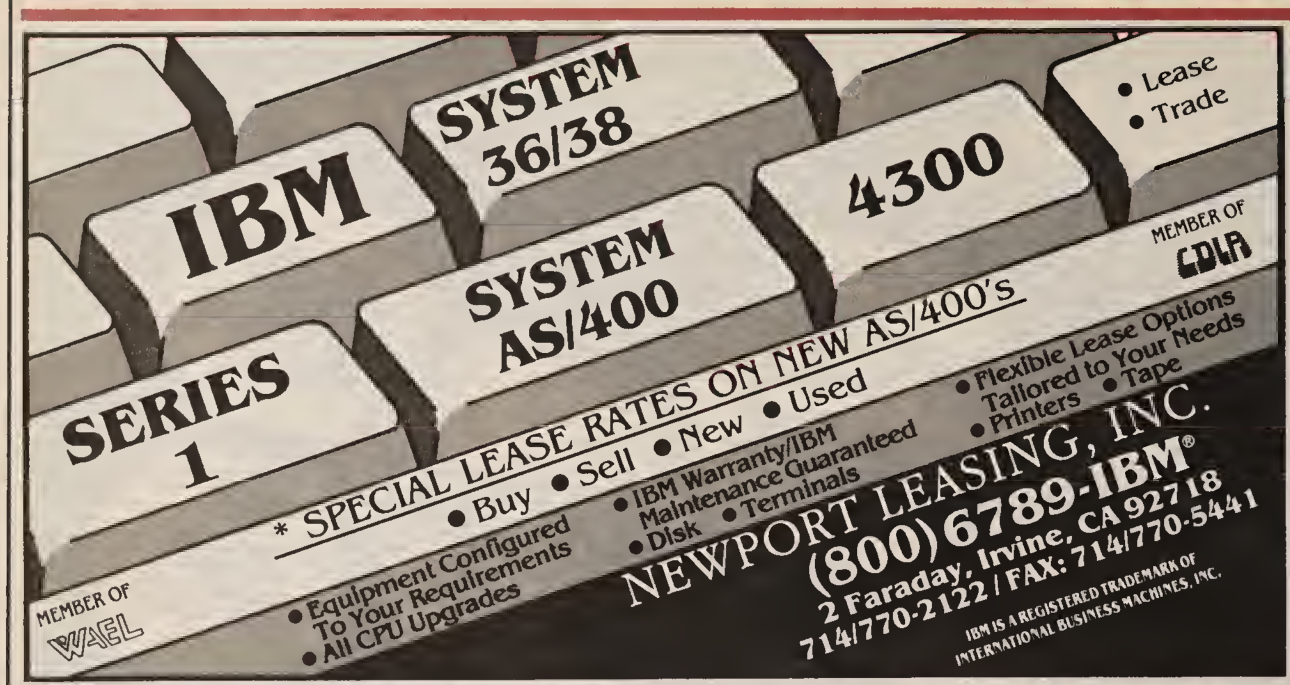

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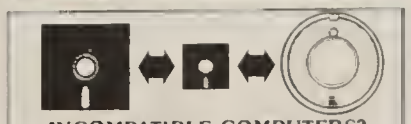

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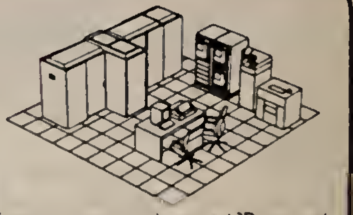

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Trying out techies as teachers

Tapping IS pros as instructors, tutors and mentors can benefit everyone

BY SUE REDKEY
SPECIAL TO CW

Times have changed. Gone are the days when it was acceptable for information systems professionals to communicate better with machines than with human beings. Today, more technical professionals are trying to improve their communication skills as their jobs increasingly require them to do so. From managers and applications programmers who work directly with clients to systems programmers who provide hot-line consulting, IS professionals are finding effective communication a key to success.

One benefit of this change is that firms can now tap technical people in ways that were not practical 10 or 20 years ago. For instance, it is no longer so uncommon for a senior programmer to effectively act as a mentor for an entry-level trainee or for a systems programmer to successfully teach a class.

Clearly, the IS training department benefits from such enhancement of skills. Technical educators who have been aware that people who can "do" cannot necessarily teach are now realizing that with some appropriate training, many technical professionals can make fine teachers.

The training staff can take advantage of this resource of technical professionals who communicate well by encouraging them to volunteer for the following types of part-time educational assignments.

Volunteer instructors. Volunteers may be your only in-house instructors, in which case they might have to develop and teach full-length courses. In other cases, volunteers may supplement a staff of full-time trainers, providing depth, advanced expertise and current knowledge of your installation.

The use of volunteers — those for whom teaching is not part of the regular job description — works best when one or more of the following are true:

- Your budget prohibits hiring a vendor.
- The subject matter requires instruction tailored to the specifics of your site.
- Little preparation is required, as when the class is one day or less in duration or is already developed.

Mentors or coaches. Experienced technical professionals can make excellent mentors or coaches for entry-level personnel. In addition to providing technical assistance, they can also help the new person adjust to the culture of the company or work group. A typical mentor may spend only two or three hours a week assisting a trainee, but the difference that that time makes can be significant.

> TECHNICAL EDUCATORS who have been aware that people who can "do" cannot necessarily teach are now realizing that with some appropriate training, many technical professionals can make fine teachers.

Tutors. Using subject-matter experts as tutors is one way of making self-paced learning more effective. A tutor may arrange specific times to meet or just be on call for questions.

You may be saying that you have tried these things and they never really work, chiefly because it is so hard for volunteers to get away from their regular work. You may be right. But if managed appropriately, this concept can work surprisingly well.

First, market the idea to management; encourage a cultural attitude that sharing of resources is valued and appreciated. Point out how everyone benefits. Managers can offer their experienced people an opportunity to stretch and develop professionally. Full-time technicians have an opportunity to network with other professionals with whom they might not otherwise come in contact, and volunteers return to their jobs with new skills, a broader outlook and often increased self-confidence.

Recognize that teaching, coaching and tutoring skills are not inborn, especially among people whose strengths are highly technical. Remember to train and coach volunteers, offering assistance when needed. Volunteer instructors and tutors need to learn how to effectively communicate complex details. Stand-up instructors need to learn competent presentation skills.

In addition, some new instructors will need to learn how to design and develop course materials. And all instructors, mentors and tutors must understand learning styles.

Finally, it is always good business to show recognition to your volunteers. If they do not feel appreciated , they might not be eager to volunteer again.

In these times of flattening organizations, we must be creative in providing opportunities for employees to be challenged, experience personal growth and find satisfaction in their work. IS trainers can create such opportunities in encouraging technical professionals to refine and practice their communication skills by volunteering to teach, be mentor to or tutor their colleagues.

Redkey is a data processing instructor at UNUM Life Insurance Co. in Portland, Maine, and author of *The Technical Instructors Handbook — From Techie to Teacher.*

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MEXICO: Henry Morales, Computerworld Mexico S.A. de C.V., Oexaca 21-2, Mexico City 7 D.F. Colonia Roma, 06700 Mexico. Tel: (011) 52 5 514 4218 or 6309. Telex: (383) 177 1300 (ACHAME). FAX: (011) 525 511 4860.

THE NETHERLANDS: Wout Berends, IDG Communications B.V., de Paulus Potterstraat 18, 1071 DA Amsterdam, The Netherlands. Tel: (011) 31 20 664 6426/664 5818. Telex: (844) 18242 (CWCOM NL). FAX: (011) 3120 796 006.

NEW ZEALAND: Martin Taylor, IDG Communications Ltd., 2nd Floor, 15 Augustus Terrace, Parnell, Auckland 1, New Zealand. Phone: (011) 64-9-779-902. Fax: (011) 64 9 774 604.

NORWAY: Morten Hansen, CW Norge A/S, Hovinveien 43, 0576, Oslo 5, Norway. Phone: (011) 472 647725. Telex: (856) 76476 (CW NOR N). FAX: (011) 47 268 0152.

PEOPLE'S REPUBLIC OF CHINA: Shen Yao, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Tel: (011) 47 81 0044. Telex: (716) 222214 (CCW CN).

SINGAPORE: Asia Computerworld Communications Ltd., 11-08/10 Tower Block, Gold Hill Plaza, 51 Newton Road, Singapore 1130, Republic of Singapore, Phone: (011) 65 250 4444. Telex: (786) RS 37003 (Comwor). FAX: (011) 65 250 4296.

SOUTH KOREA: Young S. Gimm, Hi Tech Information, Inc. 3rd floor, Youngjae Building, 1600-7 Seocho 3 Dong, Seochogu, Seoul 137-073 Korea. Tel: (011) 82 2 588 8922. FAX: (011) 82 2 582 9823.

SPAIN: Paco Zabala, CW Communications, S.A., Rafael Calvo, 18, 48, 28010 Madrid, Spain. Phone: (011) 34 1 419 4014. Telex: (831) 45522 (CW E). FAX: (011) 341 419 61 04.

SWEDEN: Bengt Mamfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Tel: (011) 46 8667 9180. Telex: (854) 14904 9 (NOVACW). FAX: (011) 46 8665 3132.

SWITZERLAND: Gebhard Osterwalder, CW Publikationen AG, Witikonerstrasse no. 15, Postfach 253, CH - 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex: (845) 816 710 (CWCI CH). FAX: (011) 41 1 55 1135.

TAIWAN: David Chu, IDG Communications/Taiwan, 4F-2, No. 137, Fu Hsin South Road, Sec. 1 Taipei, Taiwan, Tel: (011) 886 2777 5335. FAX: (011) 886 2777 5339.

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WEST GERMANY: Eckhard Utpadel, IDG Communications Verlag AG, Rheinstrasse 26/86, Postfach 40 04 29, 8000 Munich 40, West Germany. Phone: (011) 49 89 360860. Telex: (841) 5215350. (COMW D). FAX: (011) 49 89 3 60 86109.

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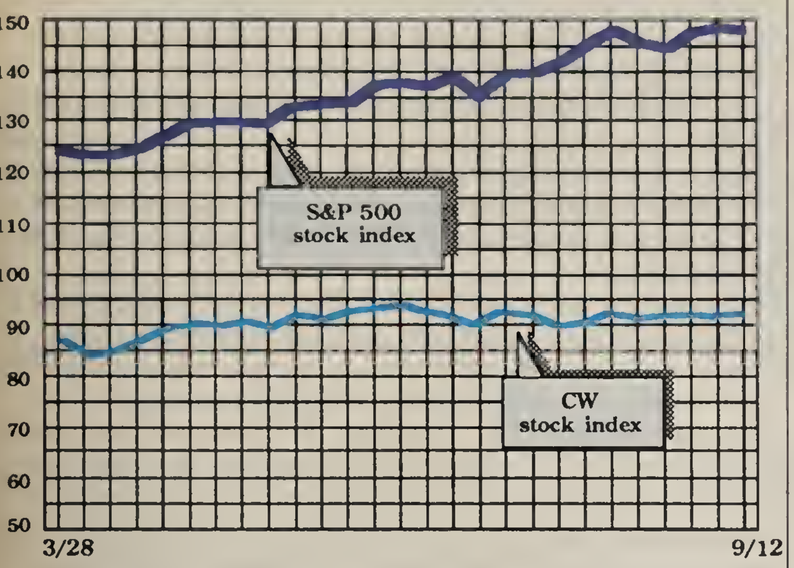

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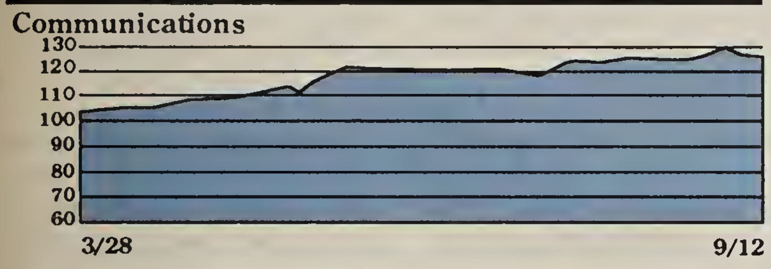
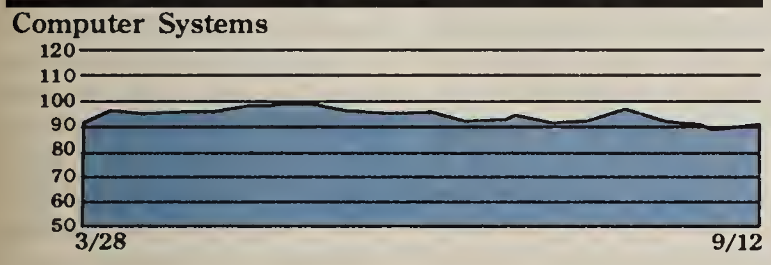
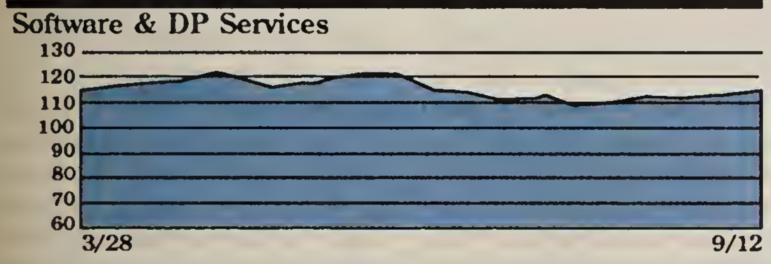
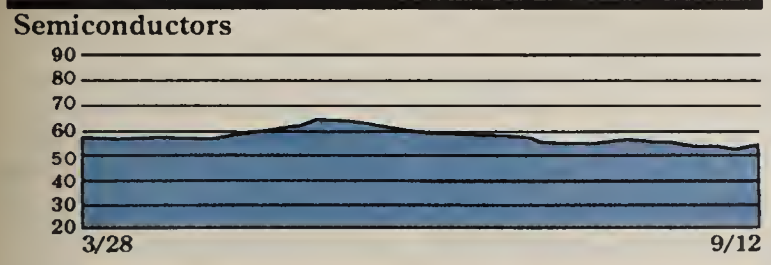
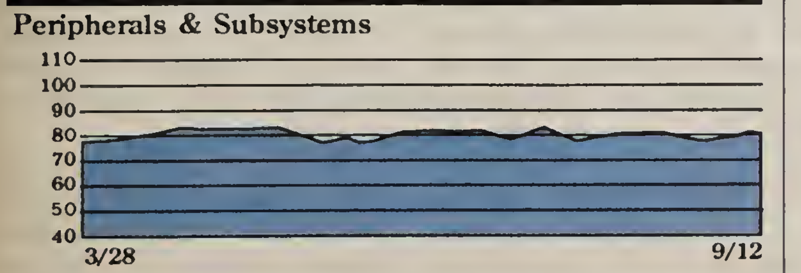
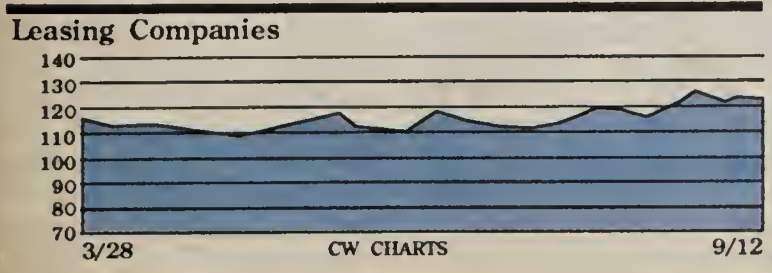












Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPT. 13, 1989

Communications and Network Services

EXCH		52-WEEK RANGE		PRICE CLOSE SEPT. 13, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	63	46	60.125	-1.3	-2.0
Q	ANDREW CORP	26	16	24.25	-1.3	-4.9
Q	ARTEL COMM CORP	9	2	7.875	0.5	6.8
N	AT&T	41	25	40	0.9	2.2
Q	AVANTEK INC	7	4	6.375	0.6	10.9
N	AYDIN CORP	19	13	18.5	-0.3	-1.3
N	8ELL ATLANTIC CORP	100	69	96	-1.8	-1.8
N	8ELLSOUTH CORP	54	39	52	1.3	2.5
Q	COMPRESSION LABS INC	11	3	9.75	-0.8	-7.1
Q	COMPUTER NETWORK TECH	3	1	2.657	0.2	7.6
Q	CONTEL CORP	35	17	33.25	0.3	0.8
Q	DATA SWITCH CORP	7	4	4.125	0.0	0.0
Q	DIGITAL COMM ASSOC	26	17	21.25	-1.3	-5.6
Q	DYNATECH CORP	21	17	19.875	0.1	0.6
Q	FI8RONICS INTERNATIONAL INC	7	3	6.125	-0.1	-2.0
Q	GANDALF TECHNOLOGIES	7	4	5.875	0.0	0.0
N	GENERAL DATACOMM INDS	7	4	6	0.3	4.3
N	GTE CORP	61	41	59.5	-1.0	-1.7
Q	INFOTRON SYS CORP	13	9	9	-0.5	-5.3
N	ITT CORP	65	48	61.125	-1.4	-2.2
N	M A COM INC	10	6	7	0.0	0.0
Q	MCI COMMUNICATIONS CORP	44	18	42.5	3.3	8.3
N	NETWORK EQUIPMENT TECH INC	27	14	26.25	1.9	7.7
Q	NETWORK SYS CORP	12	8	9.625	0.4	4.1
N	NORTHERN TELECOM LTD	23	14	20.375	-1.4	-6.3
Q	NOVELL INC	38	24	27	1.3	4.9
N	NYNEX CORP	84	65	79	-0.8	-0.9
N	PACIFIC TELESIS GROUP	47	29	44.875	-1.1	-2.4
A	PENRIL CORP	7	3	6.75	-0.4	-5.3
N	PLESSEY PLC	46	25	41.5	-0.5	-1.2
N	SCIENTIFIC ATLANTA INC	21	11	20	-0.5	-2.4
N	SOUTHWESTERN 8ELL CORP	58	39	53.625	0.0	0.0
Q	3 COM CORP	29	12	13.625	0.1	0.9
N	U S WEST INC	74	55	69	-1.6	-2.3

Computer Systems

EXCH		52-WEEK RANGE		PRICE CLOSE SEPT. 13, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	6	3	4.625	-0.1	-2.6
Q	ALPHA MICROSYSTEMS	8	5	6.875	0.0	0.0
Q	ALTOS COMPUTER SYS	9	6	7.125	0.4	5.6
A	AMDAHL CORP	23	14	15.5	0.3	1.6
Q	APPLE COMPUTER INC	50	34	45	0.3	0.6
N	8OLT 8ERANEK & NEWMAN	17	7	8	-0.4	-4.5
N	COMPAQ COMPUTER CORP	102	51	91.875	1.9	2.1
N	COMMODORE INTNL	20	9	9.375	0.0	0.0
Q	COMPUTER AUTOMATION INC	7	3	2.75	0.0	0.0
N	CONTROL DATA CORP	24	16	18	-0.8	-4.0
Q	CONVEX COMPUTER CORP	15	7	14.25	1.4	10.7
N	CRAY RESH INC	80	41	42.875	-0.4	-0.9
Q	DAISY SYS CORP	9	3	3.875	0.1	3.3
N	DATA GEN CORP	21	14	15.5	-0.4	-2.4
N	DATAPOINT CORP	6	3	5.625	0.5	9.8
Q	DELL COMPUTER CORP	13	6	6.875	0.0	0.0
N	DIGITAL EQUIP CORP	122	86	97.5	-2.5	-2.5
N	FLOATING POINT SYS INC	4	2	2	0.0	0.0
N	HARRIS CORP	36	25	35.375	0.5	1.4
N	HEWLETT PACKARD CO	62	46	50.875	-0.5	-1.0
N	HONEYWELL INC	92	57	85.25	-1.5	-1.7
N	I8M	131	106	115.375	-1.4	-1.2
Q	INFORMATION INTNL INC	16	12	14.25	1.8	14.0
Q	IPL SYS INC	9	2	6.875	-0.3	-3.5
N	MAI 8ASIC FOUR INC	19	4	4	-0.1	-3.0
N	MATSUSHITA ELEC INDL LTD	204	158	159.25	-2.0	-1.2
Q	MENTOR GRAPHICS CORP	22	12	18.5	0.5	2.8
N	N8I INC	3	1	1.625	-0.1	-7.1
N	NCR CORP	67	51	64	-1.3	-1.9
N	PRIME COMPUTER INC	21	9	9.625	-1.1	-10.5
Q	PYRAMID TECHNOLOGY	20	9	13.75	0.8	5.8
Q	SEQUENT COMPUTER SYS INC	33	14	32.875	4.3	14.8
Q	SHARE8ASE CORP	4	1	1.563	0.2	13.7
Q	SILICON GRAPHICS CORP	24	14	22.75	1.8	8.3
Q	STRATUS COMPUTER	35	21	33.75	1.3	3.8
Q	SUN MICROSYSTEM INC	23	13	16	0.5	3.2
Q	SYM8OLICS INC	3	1	1.75	-0.2	-9.7
N	TANDEM COMPUTERS INC	24	13	23.625	1.6	7.4
N	TANDY CORP	49	38	46.5	-0.3	-0.5
N	ULTIMATE CORP	13	7	10	0.8	8.1
N	UNISYS CORP	33	20	20.75	-0.9	-4.0
A	WANG LA8S INC	11	5	5.875	0.4	6.8

Software & DP Services

EXCH		52-WEEK RANGE		PRICE CLOSE SEPT. 13, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
Q	AMERICAN MGMT SYS INC	19	11	13.25	0.6	5.0
Q	AMERICAN SOFTWARE INC	20	9	19.625	0.3	1.3
N	ANACOMP INC	10	5	5.625	-0.1	-2.2
Q	ANALYSTS INTERNATIONAL CORP	20	7	20.25	1.3	6.6
Q	ASHTON TATE	28	11	12	-0.6	-5.0
Q	ASK COMPUTER SYS INC	18	8	8.375	-2.3	-21.2
N	AUTO DATA PROCESSING	45	35	44.125	0.5	1.1
Q	AUTODESK INC	42	23	41.25	1.8	4.4
Q	8MC SOFTWARE INC	25	8	23.875	1.4	6.1
Q	8OOLE & 8A88AGE INC	20	9	13.875	-0.1	-0.9
N	8USINESSLAND INC	15	10	12.5	0.8	6.4
Q	COGNOS INC	9	6	5.782	-0.1	-1.6
N	COMPUTER ASSOCIATES INTL INC	22	13	17.125	0.0	0.0
Q	COMPUTER HORIZONS CORP	10	7	7.125	0.1	1.8
N	COMPUTER SCIENCES CORP	56	44	53.125	-2.0	-3.6
N	COMPUTER TASK GROUP INC	17	11	10.75	-0.8	-6.5
Q	COMSHARE INC	40	18	39.5	7.3	22.5
Q	CORPORATE SOFTWARE	16	9	13.75	0.0	0.0
N	CULLINET SOFTWARE INC	10	4	8.375	0.1	1.5
N	GENERAL MTRS (CLS E)	56	39	55.125	0.0	0.0
Q	HOGAN SYS INC	7	4	6	0.0	0.0
Q	INFORMIX CORP	12	7	9.875	1.1	12.9
Q	INTELLICORP INC	5	3	4.25	0.3	6.3
Q	KEANE INC	19	7	18	1.0	5.9
Q	LEGENT CORP	31	16	29.25	1.3	4.5
Q	LOTUS DEVEL CORP	29	15	28	1.5	5.7
Q	MANAGEMENT SCI AMER	12	6	10.375	0.0	0.0
Q	MICROSOFT CORP	65	45	62.25	3.0	5.1
Q	NATIONAL DATA CORP	35	19	33.25	1.5	4.7
N	ON LINE SOFTWARE INTL INC	8	4	7.5	0.5	7.1
Q	ORACLE SYS CORP	20	7	19.875	1.3	6.7
N	PANSOPHIC SYS INC	18	12	15	-0.5	-3.2
Q	PHOENIX TECHNOLOGIES INC	19	4	4.5	-0.9	-16.3
Q	POLICY MANAGEMENT SYS CORP	37	22	33.25	-2.5	-7.0
Q	PROGRAMMING & SYS INC	20	13	19.5	0.5	2.6
Q	RELATIONAL TECH INC	17	8	8.125	-0.5	-5.8
N	REYNOLDS & REYNOLDS CO	34	20	26.875	0.6	2.4
Q	SAGE SOFTWARE INC	10	6	7.875	0.0	0.0
Q	SEI CORP	20	16	19.375	0.6	3.3
Q	SHARED MED SYS CORP	20	14	16.25	0.1	0.8
Q	SOFTWARE PUBG CORP	29	16	24.25	-0.9	-3.5
A	STERLING SOFTWARE INC	9	5	7.75	-0.5	-6.1
Q	SUNGARD DATA SYS INC	21	13	20.5	0.5	2.5
Q	SYSTEMATICS INC	38	26	38.25	1.0	2.7
N	SYSTEM CENTER INC	26	14	21.5	-1.0	-4.4
N	SYS. SOFT INC	30	13	29.75	1.8	6.3
Q	WORDSTAR	3	2	1.688	-0.1	-6.9

Semiconductors

EXCH		52-WEEK RANGE		PRICE CLOSE SEPT. 13, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	12	7	9	0.8	9.1
N	ANALOG DEVICES INC	13	10	10	0.0	0.0
Q	ANALOGIC CORP	11	7	10.75	1.3	13.2
Q	CHIPS & TECHNOLOGIES INC	26	11	20.5	-1.0	-4.7
Q	INTEL CORP	34	19	31.125	1.1	3.8
Q	LSI LOGIC CORP	12	8	8.625	0.0	0.0
Q	MICRON TECHNOLOGY INC	26	13	14.25	-0.3	-1.7
N	MOTOROLA INC	62	36	57.875	2.5	4.5
N	NATL SEMICONDUCTOR	11	7	7.875	0.5	6.8
N	TEXAS INSTRS INC	47	35	40.125	0.6	1.6
A	WESTERN DIGITAL CORP	15	8	8.875	0.3	2.9

Peripherals

EXCH		52-WEEK RANGE		PRICE CLOSE SEPT. 13, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLOY COMP	4	1	2.25	0.1	2.8
N	AM INTL INC	6	5	5.5	0.3	4.8
Q	AST RESH INC	11	7	8.625	0.5	6.2
Q	AUTO TROL TECH CORP	6	4	4.125	-0.2	-4.4
Q	BANCTEC INC	18	8	18.125	0.1	0.7
Q	CIPHER DATA PRODS INC	11	7	7.625	0.0	0.0
A	COGNITRONICS CORP	7	2	6	0.1	2.1
Q	CONNOR PERIPHERALS	15	7	12.5	0.9	7.5
A	DATAPRODUCTS CORP	18	9	9.375	-2.9	-23.5
A	DATARAM CORP	12	7	10	0.3	2.6
N	EASTMAN KODAK CO	52	42	48.75	0.4	0.8
N	E M C CORP MASS	6	3	4.75	-0.3	-5.0
Q	EMULEX CORP	12	7	8	0.3	3.2
Q	EVANS & SUTHERLAND	25	13	23.625	-0.1	-0.5
Q	ICOT CORP	3	1	1.5	-0.1	-7.7
Q	INTERLEAF INC	11	6	6.75	-0.3	-3.6
Q	IOMEGA CORP	5	2	2.813	0.1	4.7
Q	LEE DATA CORP	4	2	2.125	-0.3	-10.5
Q	MASSTOR SYS CORP	4	2	3.188	0.0	0.0
Q	MAXTOR CORP	12	6	11.625	-0.4	-3.1
Q	MICROPOLIS CORP	12	3	3.875	0.0	0.0
Q	MINISCRI8E CORP	10	1	1.75	-0.6	-24.3
N	MINNESOTA MNG & MFG CO	80	35	74.5	-1.5	-2.0
Q	PERSONAL COMP PRODUCTS INC	6	4	4.063	0.0	0.0
Q	PRIAM CORP	2	0	0.281	-0.1	-25.1
Q	PRINTRONIX INC	11	7	8.5	0.0	0.0
N	QMS INC	12	6	10.75	0.0	0.0
Q	QUANTUM CORP	16	4	15.25	-0.3	-1.6
N	RECOGNITION EQUIP INC	13	6	6.75	-1.1	-14.3
Q	REXON INC	8	6	7.375	0.3	3.5
Q	SEAGATE TECHNOLOGY	16	7	13	0.3	2.0
N	STORAGE TECH CORP	23	9	10.25	0.3	2.5
Q	TANDON CORP	2	0	0.813	0.1	8.4
N	TEKTRONIX INC	24	19	20.375	-0.5	-2.4
Q	TELEVIDEO SYS INC	1	0	0.719	0.2	27.7
N	XEROX CORP	69	54	66.25	-0.6	-0.9

Leasing Companies

EXCH		52-WEEK RANGE		PRICE CLOSE SEPT. 13, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
Q	AMPLICON INC	115	11	13.5	-0.4	-2.7
N	CAPITAL ASSOC INTNL INC	9	5	7	0.3	3.7
N	COMDISCO INC	32	19	31.125	0.8	2.5
Q	CONTINENTAL INFO SYS	5	0	0.688	0.0	0.0
Q	LDI CORPORATION	18	13	17.5	0.8	4.5
Q	PHOENIX AMERN INC	5	3	3.75	-0.5	-11.8
Q	SELECTERM INC	9	5	7.5	0.0	0.0

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL

Disk crash

Investor confidence crumbles after report points to fraud

It was time for Miniscribe Corp. to face the music last week. After an internal investigation produced reports of alleged widespread and high-level fraud (see story page 95), Wall Street delivered its verdict on the Colorado-based disk-drive maker. Miniscribe fell ½ of a point to close Thursday at 1¾.

Ask Computer Systems, Inc. tumbled 2½ points to close at 8⅛ after reporting lower first-quarter profits. 3Com Corp., on the other hand, announced it will not be in the red for its first quarter; the expected profit did not help, as 3Com fell 1 point to finish at 13⅞. Analysts dimmed their projections for Digital Equipment Corp. this week, and DEC shares dropped 1⅜ points to close at 96¾. IBM finished at 115¾, off ¼ of a point.

Software vendor Comshare, Inc. held a meeting last week to showcase its latest executive information systems, and investors seemed to like what they saw. Comshare gained 6¾ points to close at 39¾.

Novell, Inc. announced a lower third-quarter net income, but it was better than the company expected; the improved showing boosted Novell to 28, up 3 points. Despite lagging microprocessor sales, chip makers Intel Corp. and Motorola, Inc. improved. Intel added 1¼ points to finish at 31, and Motorola closed at 57, up 1⅛.

JOSEPH J. FATTON

Merrill Lynch in net experiment

BY ELISABETH HORWITT
CW STAFF

NEW YORK — The payback for becoming the first customer of network management services jointly provided by IBM and MCI Communications Corp. is a "free" upgrade to the kind of intelligent, integrated multivendor system that most IS managers only dream about, according to Duwayne Peterson, Merrill Lynch & Co.'s executive vice-president of operations, systems and telecommunications.

The risk for Merrill Lynch is that it is entrusting its corporatewide network to IBM and MCI when "they are just getting into the business," Peterson said. "So it's a judgment call whether they can deliver what they promise."

A five-year contract, which the parties expect to sign next month, calls for MCI and IBM to develop a tailored system that will centrally manage Merrill Lynch's network from IBM's network control center in Raleigh, N.C.

The investment firm will transfer 45 to 50 employees from its current network management staff to MCI and IBM payrolls, retaining 20 staffers for the internal center, Peterson said.

One of the biggest selling points of MCI and IBM's offer was their willingness to take on the costly job of revamping and integrating Merrill Lynch's existing network management system, "which we thought would be impossible for us to do by ourselves," Peterson explained.

The contract's $50 million price tag is about what Merrill Lynch would have had to pay to operate its existing system over the same period without any major upgrade, Peterson said.

Lack of experience managing other companies' networks, coupled with an eagerness to gain a major customer, probably made IBM and MCI more willing to tailor their solutions to Merrill Lynch's needs, Peterson said.

In contrast, General Motors Corp. subsidiary Electronic Data Systems Corp., another contender for the contract, insisted that Merrill "fit more into the EDS mold [of a] more generalized approach they already had," he added.

The agreement represents the next phase of a project, begun last year, to re-evaluate the investment firm's telecommunications network. The project resulted last June in a five-year, $150 million contract for MCI to become the sole provider of Merrill Lynch's telecommunications services [CW, June 12].

The system will monitor, troubleshoot and perform capacity planning for the investment firm's entire telecommunications network, both in the U.S. and overseas.

It will also provide a "manager of managers" — based on IBM's Netview — for coordinating diagnostics, monitoring, troubleshooting and data collection across seven subsystems that are currently installed at Merrill Lynch.

Currently, each subsystem manages a different vendor's network offering, such as Racal-Milgo modems, Network Equipment Technologies, Inc. T1 switches and MCI T1 services.

Extras

IBM and MCI will incorporate several unannounced features into Merrill Lynch's network management system. The features, which may become commercial products, include the following:

- Expert systems designed to quickly pinpoint problems and invoke prearranged action, such as rerouting of transmissions to backup lines, to get the system up and running again while the problem is fixed.
- More direct, real-time access to traffic and error information concerning the MCI circuits that carry Merrill Lynch's traffic.
- New lines or capacity and the ability to track the status of orders via direct terminal connection into MCI's system.
- Integration of a variety of vendors' products into Netview, through an IBM RT, which will concentrate transmissions from various devices, filter out irrelevant information, translate the remaining messages to the Netview format and send them up to the Netview host, said James Boyle, vice-president of network operations at IBM's National Service Division.
- Two-way links between Netview and non-IBM networking devices.

CA casts some light on Cullinet database plans

BY ROBERT MORAN
CW STAFF

In an effort to calm its newest customers, Computer Associates International, Inc. announced the strategic direction of the IDMS database it officially acquired with Cullinet Software, Inc. last week and CA-Datacom/DB, an earlier acquisition.

In brief, the company said it plans to continue integrating its products under its Applications Construction Environment. To that end, CA said it will add CA Extended SQL to IDMS, now known as CA-IDMS/DB.

As positive proof that it could extend the flagship Cullinet product and maintain compatibility with the old IDMS, CA referred to its work on CA-Datacom/DB, which it gained with the acquisition of Applied Data Research, Inc. last year. That product has been retooled with aspects of its CA-Universe relational database and SQL.

Curtis Corder, coordinator of operations systems and data administration at Northwest Natural Gas in Portland, Ore., said the company has been beta-testing CA-Datacom/DB Release 8.0 since July and that the new version exploits IBM's Enterprise Systems Architecture as well as referential integrity and SQL.

"We have some subjective results as far as response time given by ESA," Corder said. "They appear very promising and should significantly reduce I/O."

Northwest Natural Gas has yet to test referential integrity, but Corder said the SQL extensions have enabled the firm to use SQL syntax to create tables and views and to populate those tables, abilities unavailable with former releases, he said.

CA did not address the overlap with Cullinet in manufacturing and banking software. Contrasting its urgency to address the fate of the Cullinet database, Sanjay Kumar, CA vice-president of strategic planning, said, "The Cullinet banking software is still only in beta-testing, and the products are not complete."

CA strategic direction calls for introducing CA-IDMS/DB Release 12.0 by the fourth quarter of 1990 with the integration of SQL support.

Janet Schacht Hall, president of the Dallas Cullinet User Forum — where CA Chief Executive Officer Charles Wang addressed 110 attendees the night of the acquisition — said, "The reception was positive, and the users liked what they heard."

Schacht Hall said users did not view the announcements as vaporware and that many cited the successful implementation of SQL to CA-Datacom/DB as a confidence booster.

CA will also introduce Release 1.4 of the former Enterprise:DB for DEC VAX/VMS systems. Kumar said the relabeled CA-DB/VAX now recognizes CA-IDMS/DB access as well as SQL. The next release, set for testing in late 1990 or early 1991, will recognize CA-Datacom/DB, Kumar said.

Robert Desautels, software research analyst for the Software Research Group at International Data Corp. in Framingham, Mass., predicted CA will retain CA-Datacom/DB and CA-IDMS/DB as separate products.

However, Desautels said that CA-Datacom/DB will be positioned for the smaller IBM processors such as the Application System/400, 9370 and Personal Computer. In contrast, CA-IDMS/DB will be positioned for high-end IBM mainframes and the VAX platforms.

Not so, Kumar said. "The products can perform side by side," he said. "There are differences, but eventually there might not be differences in who does what to what."

George Schussel, president of Digital Consulting, Inc. in Andover, Mass., said CA now owns source code for three different SQL implementations, which will enable it to build products using the best of each.

Nevertheless, disparate products and disparate user bases are an immediate disadvantage to the software giant. "CA needs three or four years of development time to build a more integrated product set," Schussel said. "If they can buy that time, they will be a principal competitor to IBM — a choice that will help the industry."

Cullinet

FROM PAGE 1

chance of being retained after some are let go in the wake of the acquisition.

Top Cullinet officials such as vice-presidents Papows, John Landry and Robert Weiler are almost certain to depart. They are among 25 Cullinet employees covered by "golden parachute" agreements.

Sanjay Kumar, CA vice-president of strategic planning, said Cullinet employees will be informed this week whether they have positions. He would not say how many will lose their jobs. At Cullinet last week, some guessed the toll would impact 500 employees from a total of 1,600.

Late last week, Cullinet sources said some employees were told to no longer report to work and were informed that they would be contacted later for exit interviews. CA said it could not comment on those reports.

According to Wang, five of seven top Cullinet sales executives will remain with CA. He added that the Cullinet service and support structure will remain intact but that there will be reductions in numbers in areas of "redundancies."

Several Cullinet workers expressed optimism about their prospects last week, banking on the value of the installed customer base. CA is "inheriting 2,000 IDMS customers," said a Cullinet software engineer. "If they get rid of us, they're dead."

"This probably holds the best hope for the enhancement of IDMS/R," another said.

Nevertheless, last week's action was depressing for many. "It's devastating; it's very sad to see the name go away," said a support staff member. "We want CA to realize that Cullinet people have a lot of pride. They say they like that. We'll see if they really mean it," she added.

Other employees expressed some resentment toward management because it failed to turn the tide. "We all thought Cullinet would make it back. I feel we got sold out, and I don't know by whom or how," one member of Cullinet's customer support staff said. "You're talking one group of severely beat-up people," a developer said.

Cullinane said he plans to learn to speak French and play the piano, as well as start a company to look into promising new technologies. "Forcing oneself to learn something new and different is good for one's spirit and health," Cullinane said. Cullinane's CA stake is estimated at $18 million.

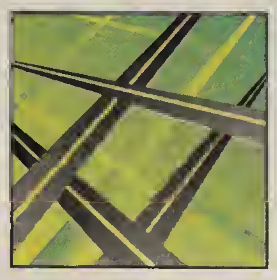
While acknowledging the damage done to Cullinet by IBM's DB2, badly timed management decisions and corporate extravagance, the greatest problem was the shrinking of the mainframe software market caused by the personal computer revolution, Cullinane said: "The mainframe software business was fantastic for 15 years. Cullinet did it better than anyone. Now, it's over."

Bush tech policy lacks money

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Bush administration officially released its high-tech policy last week — calling for intensive research on high-performance supercomputers, software and a national information network — but made no promises that there will be money to pay for it all.

The ambitious five-year research and development program has a price tag of $1.9 billion. In essence, it will create a nationwide network of supercomputers sporting parallel processing capability and advanced problem-solving algorithms.



The interagency report, released by the White House Office of Science and Technology Policy, also provides a political boost for a bill sponsored by U.S. Sen. Albert Gore Jr. (D-Tenn.) that would implement a very similar program. Gore's bill is headed for action in the Senate Committee on Commerce, Science and Transportation this fall and a Senate vote before the end of the year, a congressional aide said.

A major component of the program is the development of a National Research and Education Network (NREN), which would link academic, government and commercial researchers at speeds of up to 3G bit/sec. in the late 1990s [CW, Aug. 14]. Eventually, NREN would be converted from a government operation to a commercial service open to general subscribers.

The Federal High-Performance Computing Program is needed to boost U.S. competitiveness in civilian and defense technologies, as well as solve some of the nation's greatest research challenges, the interagency report said. For example, researchers on the supercomputer network could collaborate on semiconductor design, medical research, superconductivity or global climate changes.

However, White House officials said the report is merely a planning document for federal agencies. "Programs discussed in this document are subject to budget constraints and administration approval," the report's disclaimer said.

Consequently, federal agencies are lobbying the White House to include funding for the first year of the program in the fiscal 1991 budget that President Bush will submit to Congress in January. "The question is how rapidly we can move forward on all these fronts," said William A. Wulf, director of the computer science program at the National Science Foundation. "The important thing is to get on with it now . . . so we can put ourselves in a stronger competitive position," he said.

The report calls for $150 million over current spending in the intensified program's first year.

Typhoon

FROM PAGE 1

government is biting off its nose to spite the nation's face.

"There's no question that the end user suffers whenever you have official limitations on free trade," said Omri Serlin, president of Los Altos, Calif.-based Itom International, Inc. "It's become a very emotional issue where matters of belief have occasionally been strangling the facts."

In many ways, the supercomputer industry has become the rallying point for the frustration that has evolved through America's trade slippage. Like the space program, supercomputers have become a matter of national pride so intense that some believe that unless the U.S. is far ahead, it is way behind.

Supporters of the unofficial embargo are not afraid to tug at nationalistic heartstrings to justify their cause. John Rollwagen, chief executive officer at Cray Research, pleaded before the Senate Subcommittee on Science, Space and Technology that the U.S.' lead must be maintained because supercomputers are "the only truly offensive weapon in our economic race for global industrial leadership and continued national security."

With some configurations costing more than $20 million, the sale of a supercomputer can make an awfully big splash — or a terrible punch in the stomach. "If we were talking about Toyotas, I don't think it would be such a big deal," said John Sell, president of the Minnesota Supercomputer Center.

Some charge that a thinly-veiled jingoism obscures what are essentially technological issues. "Supercomputers are only tools, and the important thing is how we use these tools," said Gary Smaby, an analyst at the New York-based Needham & Co. research firm. "It's the carpenter we should worry about, not the hammer."

Unfair?

However, the Bush administration is clearly worried. On June 1, the Japanese government was cited under the 1988 Omnibus Trade Act for unfair supercomputer procurement tactics — despite the fact that 16 Cray and ETA systems are installed in Japan and only one Japanese supercomputer resides on U.S. shores. If the "unfair" tactics are not corrected, U.S. Trade Representative Carla Hills warned, then retaliatory tariffs could result.

The tactic has left some vendors smarting. "We're not two-headed monsters; we're technically competent, professional people who'd just like a chance to compete on a level playing field," said Samuel Adams, a vice-president at HNSX Supercomputers, Inc., a joint venture of NEC and Honeywell, Inc. in Burlington, Mass.

However, with some analysts predicting that market leader Cray may be fighting for its lead within two years, U.S. officials are determined not to let the U.S.' edge slip away. A bitter taste still lingers in the mouth's of those who saw the evaporation of U.S. dominance in the consumer electronics and semiconductor markets.

Last week, the President's Office of Science and Technology Policy proposed a $1.9 billion plan in which the U.S. would almost double its spending on advanced computing research technologies (see story above), resulting in the development of supercomputers that may be up to 1,000 times faster than today's most powerful computers.

Economies of scale

While still growing, the supercomputer market is being eclipsed by lower cost, high-performance systems

	U.S. annual unit shipments	
	'89	'93
• **Supercomputers**	315	416
• **Minisupercomputers**	2,360	6,340
• **Mainframes**	1,905	2,145
• **Superminicomputers**	17,100	23,300
• **Other high-performance systems**	9,900	12,500
• **General-purpose workstations**	162,600	315,000

SOURCE: ELECTRONIC TREND PUBLICATIONS

CW CHART: JOHN YORK

While Japan is not the only recipient of close scrutiny — the Bush administration is still sharply divided over whether to permit the sale of supercomputers to Brazil, India and Israel — it is perceived as the greatest threat. Japanese firms have been accused of trying to secure a toehold in the U.S. market by drastically cutting prices, eliciting bitter memories of Japan's earlier habit of slashing semiconductor prices and dumping them into the U.S. market.

But this does not faze the Japanese, who have pressed on with their efforts. Although U.S. vendors have taken large bites of the Japanese market in every area from PCs to minicomputers, the Japanese have chosen to take back supercomputers. Why? In Japan, computing remains more centralized; the mainframe-in-a-glass-box complex persists, with supercomputers layered on top. Typical research organizations are large and industrial rather than relatively small, academic and scraping for funds, as is normally the case in the U.S.

The impetus for the challenge was provided in 1981, when Japan announced its Fifth-Generation Computer Project. The goal was to completely supplant the existing state-of-the-art supercomputers by 1991, and ambitious research and development programs were launched by NEC, Fujitsu and Hitachi.

Eight years later, Japan's efforts are paying off. Part of its aggressive game plan stems from its awe of a towering corporate giant on its shores — IBM Japan. "IBM Japan dominated computing in that country for years, and they did it in a way that Japanese vendors can understand best: by muscular, persistent marketing and dawn-to-dawn attention to customers," said Norris Parker Smith, editor of "Supercomputing Review." "IBM Japan was the model, goal and goad for the big three Japanese computer firms."

As such, Parker Smith notes, Cray's dominance in the supercomputer industry does not seem like an insurmountable hurdle. "In Japanese eyes, Cray must seem like an anomaly — a tall but narrow spire, deserving respect but not necessarily fearsome," he said.

Japanese computer companies accustomed to competing brutally on their own shores can be expected to apply that same verve in the worldwide supercomputer market. Already, several firms claim greater performance than high-end Crays. And more are on the way. Fujitsu is now working on a supercomputer the size of a basketball that fits inside a liquid-helium-cooled refrigerator — an idea that IBM gave up on six years ago. Whether U.S. firms will ever get to try it out is another question.

It is clear, however, that U.S. officials intend to put up a fight. The federal government has played a key role in the development of supercomputers and plans to continue. A lot has to change, however. In the U.S., supercomputers exist in a rarefied atmosphere, but that is not the case in Japan — and therein lies part of the Japanese success. Now, the U.S. is trying to duplicate that hands-on atmosphere.

The U.S. is also likely to continue to stretch out its lead in application software, a critical area in which Japan is lagging behind. Vendors such as Cray also continue to receive support from many national laboratories, where their performance parameters are extended daily.

Although in some areas the feud is abating — Cray and Hitachi, for instance, each agreed to cross-license some of the other's patents — supercomputers are likely to remain one of the most war-torn sections of the computer world. If they do, analysts warn, only losers will result. "It's the U.S. researchers and scientists who will be deprived," said Lana Kartashev at the International Supercomputing Institute in St. Petersburg, Fla. "Ultimately, we hurt no one but ourselves."

Second-class postage paid at Framingham, Mass., and additional mailing offices.
Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January of 1989 by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.
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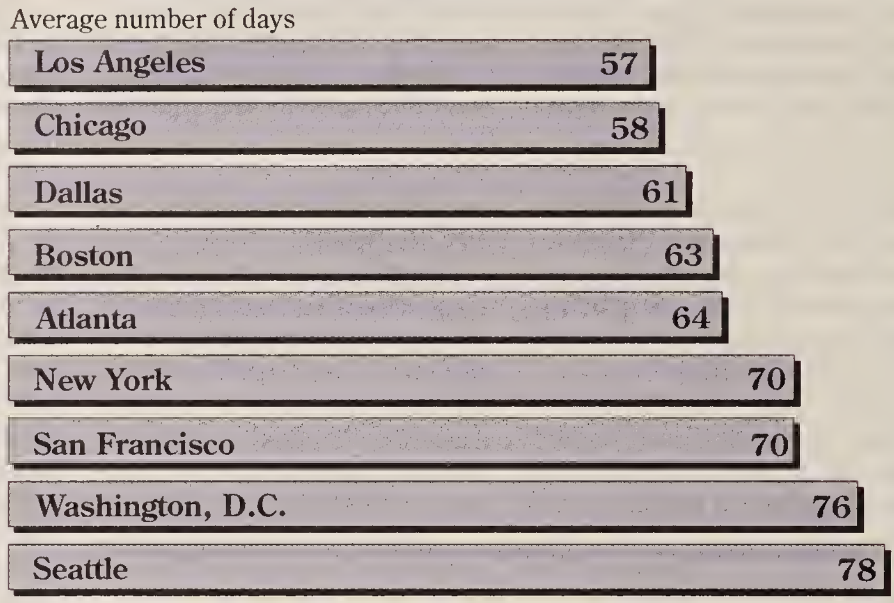
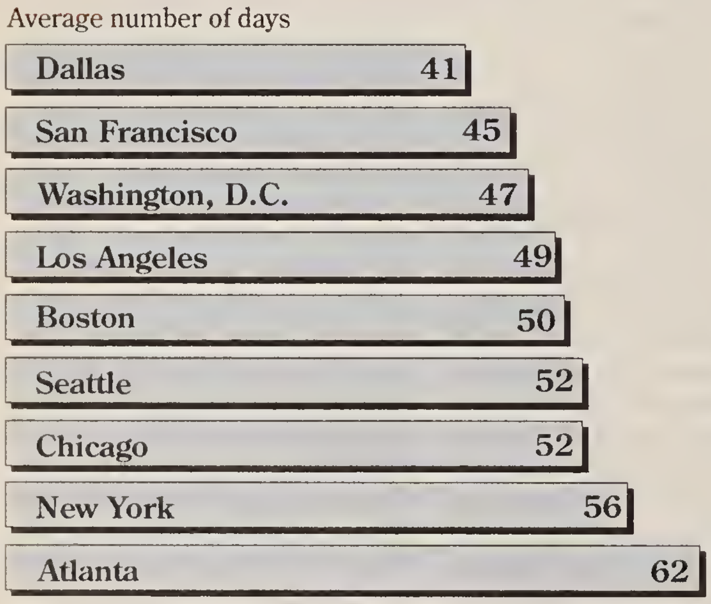
TRENDS

A CW survey of IS managers shows Texas and the West Coast fill vacancies fastest

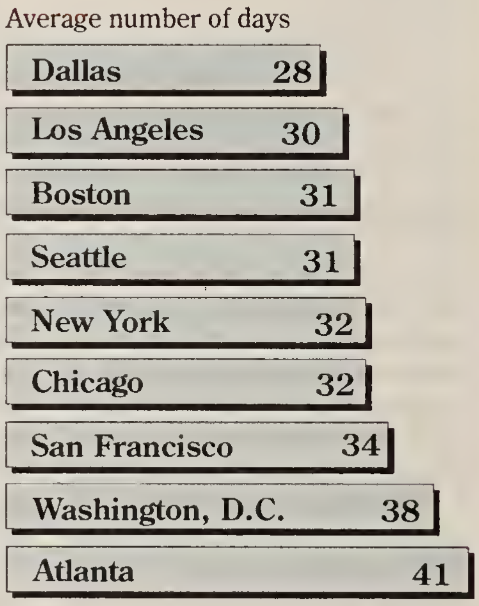
Q How many working days did it take to fill your last vacant senior-level position?



Q How many working days did it take to fill your last vacant middle-management position?



Q How many working days did it take to fill your last vacant entry-level position?



SOURCE: CW SALARY SURVEY

CW CHARTS: JOHN YORK

NEXT WEEK

Cadbury Schweppes, Inc. CIO **Joe Nash** has put into practice an innovative approach to the IS/user relationship. To identify users' automation needs at firms acquired by Cadbury, IS staffers spend weeks studying the business operation on-site, forbidden to talk technology until the review is complete. A report appears in Manager's Journal.

JOYCE RAVID

Strategies have shifted and price scrimmages have inflicted some heavy casualties at the end of the hardware spectrum that encompasses PCs, workstations and small systems. The second half of *Computerworld's* annual Hardware Roundup provides rundowns of the year's wins and losses in each league, along with rosters of active players.

INSIDE LINES

Change partners!

Courtroom enemies Apple and Microsoft could shock the computer community this week with an agreement to swap software technologies for controlling printers and typefaces, sources close to the companies say. Apple has begun to sever ties with page-description language (PDL) software producer Adobe and announced its intent to create or license a clone of Adobe's popular Postscript program. Microsoft recently obtained such PDL technology when it purchased San Jose, Calif.-based Bauer Enterprises. In exchange, Apple will allow Microsoft to use a new technology for creating typefaces of varying sizes.

One foot on the runway

Covia's choice of Cincom Systems' Netmaster over IBM's Netview could well be an interim decision, according to the airline subsidiary's newly appointed CIO Mark Teflian. Indeed, Covia is "working with IBM on a future Netview" that will include such goodies as a "closed-loop system that will be able to perform end-to-end diagnostics" across the network, Teflian says. Covia also expects IBM to cure the warts that made Netview less viable than Netmaster in the first place, such as lack of integration between application domains and a user-hostile command language.

Memory of an elephant

Microsoft seems to be of two minds on user complaints about OS/2's appetite for memory. Microsoft product manager Cameron Myrvold says that on the one hand, users are willing to pay for things that run hardware faster: "Look at the success people have had with [Intel] 80386-based hardware." Then again, he admits that a drop in memory prices is "very important to make OS/2 more affordable to move to."

Not any cheaper by the dozen

AT&T may be having second thoughts about giving users such great deals on individual lines under its Accunet Spectrum of Digital Services tariff. A 64K bit/sec. circuit costs less than one-fourth of a comparable Dataphone Digital Service (DDS) line — a great deal. But the whole point of Spectrum is supposed to be fractional T1, which makes it cheaper for customers to buy lines in bundles. Buying a dozen Spectrum circuits costs only about 10% less than buying them individually — not much of an incentive.

The name game

The long-awaited IBM repository will be called "The Repository/MVS" in its first iteration, according to a source close to the announcement. But hold on to your hats. There are reports that names have been changed several times in the past few weeks and that the label for the whole strategy, AD/Cycle, only cropped up for the first time a month ago. Says an IBM official to one CASE vendor: "This is the most-disclosed IBM announcement since the AS/400."

DEC Repos-itioning

DEC is planning its own CASE offensive following IBM's repository extravaganza this week. Word is that the official date for a DEC CASE announcement is Oct. 3. A new version of the RDB DBMS and enhancements to the CDD Plus data dictionary will be among the CASE offerings.

Seeing is believing

IBM has achieved ratings of 60 to 100 MIPS on a single RISC processor running its AIX operating system, said Marc Shulman at UBS Securities. Although that does not mean it will introduce a model with that performance, a high-end system doing 40 to 50 MIPS is likely, he says. A 40- to 50-MIPS RT would propel IBM past Sun and other workstation vendors into the realm of minicomputers, if it ever gets out the door.

As Richard Miller sweeps through the halls of Wang, putting his iron fist to the guts of lackadaisical managers, one comment from a Wang employee was judged notable enough to bring to our attention: "I don't know if I like working for a living." If you've got brighter news, bring it to the attention of News Editor Pete Bartolik at 800-343-6474 or 508-879-0700. Hey, he'll take the bad news, too.

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